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SPECIAL VIETNAM ISSUE

UNITED STATES ARMY AVIATION DIGEST

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Introduction 1
Moonlight Train to Long My, Lt Col Rufus L. Legett 2
Steady . . . You're Hooked 7
Skyraider Support, Lt David H. Price 8
Mission . . . Rescue, William H. Smith 12
This Special Issue 15
Army Aviation in Vietnam 24
Searchlight for Helicopters, Col Pen F. Hardaway 26
Typical Day, Maj Anthony A. Bezreh 28
On Site Oil Cooler Swap, Capt Fred R. Michelson 30
Crash Sense 33

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

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. . . Mindful of the men in Army Aviation—from their initial contributions on the sagebrush prairies of Fort Sill to their gallant service in the jungle mountains and paddies of Vietnam . . .

MAN'S STRUGGLE for freedom has taken many forms as he defends his cherished God-given rights against the forces of darkness. In the last 25 years a sturdy new breed of warriors has joined the ranks of freedom fighters.

In Vietnam, Army Aviation's warriors have come of age. Attacking through the air with helicopters and airplanes, they have unveiled a new concept of warfare that boasts the speed and power to strike like a bolt of fateful lightning at the elusive enemy's heart.

This issue is dedicated to those who shed their sweat, their blood, their tears—and especially to those who have given their lives—for their country in a faraway place called Vietnam.

To call a roll of those who deserve this Nation's eternal gratitude would be totally inadequate. For the human mind is prone to error and surely someone or some unit would be unintentionally, and regretfully, omitted. There are *so* many—

• The gunner ripping the Viet Cong with the door gun of a Huey.

• The aviator as he zips along at treetop level with his precious cargo of warriors in the belly of his Shawnee or perhaps Chinook.

• The maintenance people who throw off the miseries of heat, mud, dust, and lack of sleep to feverishly work through the night to have the Mohawk, Seminole, Beaver, or Bird Dog ready to go at daybreak.

• The recovery team, braving the fusillade of gunfire at their Mojave or Flying Crane, as they rescue a downed Sioux or Otter.

• The crewchief, riding in his Caribou and with full confidence in the man flying it into shortest of strips because food, medical supplies, and ammunition are needed NOW.

• The controllers, the planners, the medics, the POL specialists . . .

No one is forgotten by true Americans. They are recognized at places like Do Xa, Tay Ninh and Plei Me just as their predecessors on battlegrounds like Yorktown, Iwo, and Heartbreak Ridge.

All aboard for imaginary ride on the

Moonlight Train to Long My

Lieutenant Colonel Rufus L. Legett

IT IS 0220 hours and not as hot as usual, thanks to a cooling rainshower that passed over the delta south of Saigon. The clouds are higher now and a tranquil darkness embraces the rice paddies, canals, and rivers of the vast Mekong Delta region.

Long My, a government outpost south of Saigon, is not sleeping. The tower sentry and other personnel are watchful and uneasy. Ap Binh Chanh, a civil guard manned outpost on a road 10 kilometers farther south, was attacked earlier in the night by the Viet Cong. Sounds indicative of a fierce battle had rumbled through the night.

The Long My outpost guards a major road intersection by a large canal. It is a triangular shaped fort complete with a drawbridge over a moat filled with sharp bamboo stakes—a holdover from the days of French influence. Long My is larger and better fortified than most of the delta outposts. It has radio communication with the chief of Kien Hoa Province, who in turn is in contact with Saigon.

The garrison at Long My consists of infantrymen of the Army of the Republic of Vietnam (ARVN) bolstered by a 4.2 mortar section. Both illuminating and HE (high explosive) ammunition is available.

Long My fortifications are constructed of concrete and earth with several sandbag positions protecting the mortars and ammunition. Each earthen wall is 400 feet long by 20 feet high, with a 20 foot concrete sentry tower at each corner. Veteran, battle-tested guards man these towers. The radio is mounted in the north tower, which is the most secure structure and also the command post.

After the first sounds of battle from Ap Binh Chanh were heard, the province chief was alerted and all battle positions at Long My

Civil guard manned outpost under attack by Viet Cong

Photos below and right courtesy "Air University Review"

were manned. But as the night wore on no communications were received from the embattled outpost to the south.

Areas around Long My are infested with thousands of active, hard-core communist guerrillas. Their aggressive tactics have proved that they are well led, well trained, and (compared to most VC units) well equipped. They are die-hard communists who use terror tactics to intimidate the people of this area. They control and exploit vast areas for taxes and supplies to support their operations.

The ARVN officer commanding the Long My outpost expects the Viet Cong—exuberant from one success—to momentarily attack his outpost. At 0221 hours a listening post 300 meters to the southeast sounds an alarm. The mortar section is ordered to illuminate the area in front of the listening post, and the ARVN commander reports his actions to the province chief via radio. Unknown to him, his actions set off a carefully planned night counteraction, *Operation Moonlight Train,* which will deliver the Viet Cong a serious blow and measurably reduce their heretofore unopposed night attacks.

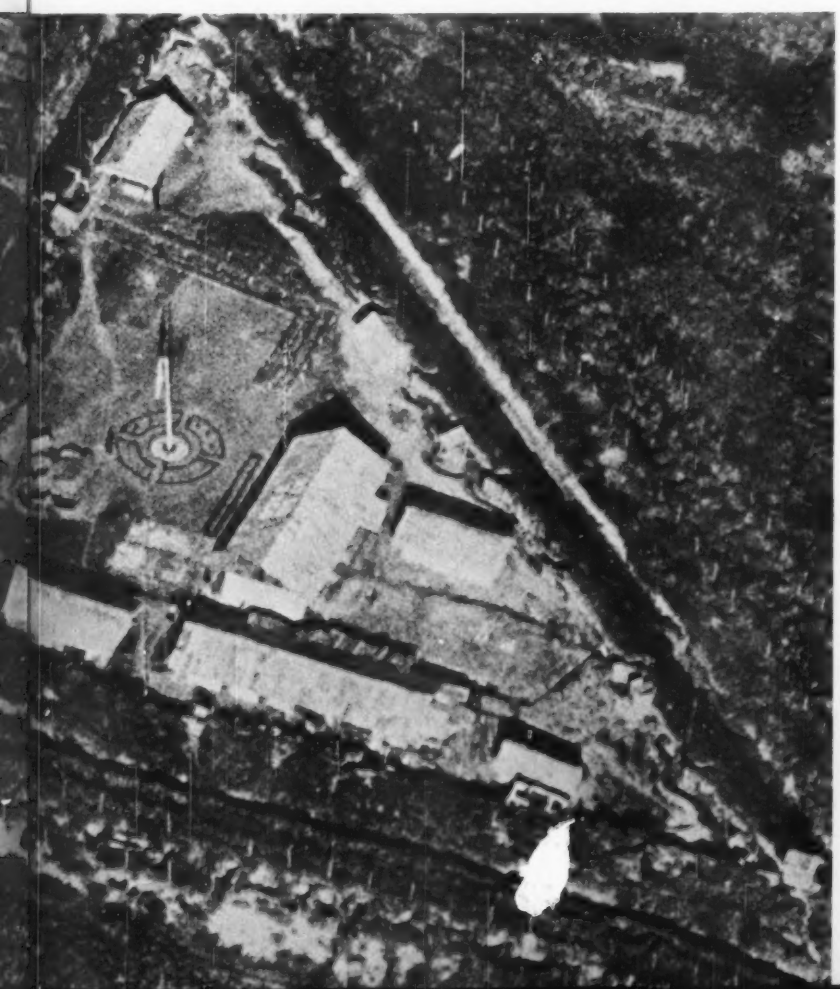
Col Legett is chief of Brigade and Division Branch, Advanced Studies Division, Combat Developments Command Aviation Agency, Ft Rucker, Ala.

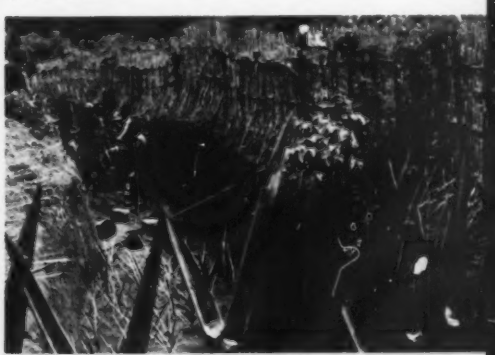
It is earlier the same night—2305 hours to be specific—at corps headquarters in the delta south of Saigon. This headquarters has just been alerted to the attack on the Ap Binh Chanh outpost south of Long My and is anticipating additional Viet Cong activity. The Vietnamese duty officer at corps is in contact with the staff and the American advisor. All agree that this may be the long awaited opportunity to test *Operation Moonlight Train.*

At 2310 hours the Joint Air Operations Center (JAOC) is alerted to send a flare-equipped C-47 aircraft (code name "Red Devil") to the vicinity of Ap Binh Chanh. The Vietnamese Air Force scrambles two A-1Es to deliver ordnance on call from the C-47 flare ship.

At 2315 hours a nearby U. S. Army helicopter base is alerted, and troop-carrying UH-1D Hueys are placed on standby along with UH-1B armed escort helicopters. The unit is assigned the code name "Wine Tree" for this operation.

ARVN troops trained in air-mobility tactics are placed on a 15 minute alert. Meanwhile the commander and operations officer of another nearby Army helicopter unit (code name "Blue Boy" for





Triangular shaped forts with punji traps dot the landscape of the Republic of Vietnam

this operation) are meeting with a Vietnamese Air Force (VNAF) captain representing JAOC, his USAF advisor, and liaison officers from other units that will participate in the operation. Personnel from two newly arrived units are present:

• An aerial weapons unit composed of UH-1B helicopters equipped with weapons and a floodlight system especially designed for area fire at night.

• A unit composed of CH-47s mounting powerful searchlights.

The plans of Operation Moonlight Train had been worked out in detail. For this operation Wine Tree will lift 180 ARVN troops in UH-1Ds escorted by armed UH-1Bs. Blue Boy will lift 150 troops in UH-1Ds and 120 paratroopers in C-123s. They will be accompanied by UH-1B aerial weapons ships. A CV-2B outfitted as an aerial TOC (Tactical Operations Center) will be positioned over or near the objective area for radio relay, aerial radar control capable of identifying and mapping landmarks, and command post.

Four of the CH-47s are to provide either artificial moonlight or direct light as needed. Another CH-47 will be on standby to recover damaged aircraft or used as needed.

Three of the moonlight ships will be sited at a hover out of ground effect or in orbital flight patterns as their huge searchlights are directed toward the clouds and "artificial moonlight" is reflected back to the ground. This technique is not too different from successful employment of searchlights in WW II and in Korea. It allows aircraft to identify objective areas and flight paths. The fourth CH-47 (also equipped with a searchlight) will be a spare. It could be used to pinpoint an area such as a canal or roads should the Viet Cong attempt to break contact or reinforce. The searchlights on the moonlight ships are controlled from the cockpit and capable of 60° vertical and 35° horizontal movement.

All is in readiness for Operation Moonlight Train!

• • •

At 2330 hours the C-47 aircraft "Red Devil" reports ceilings at 2,500 feet with light to moderate rainshowers northwest of the objective area. A higher layer of clouds exists at 8,000 to 9,000 feet.

Ten minutes later Red Devil reports low clouds dissipating or moving west and despite use of flares no lights or movement visible in the objective area.

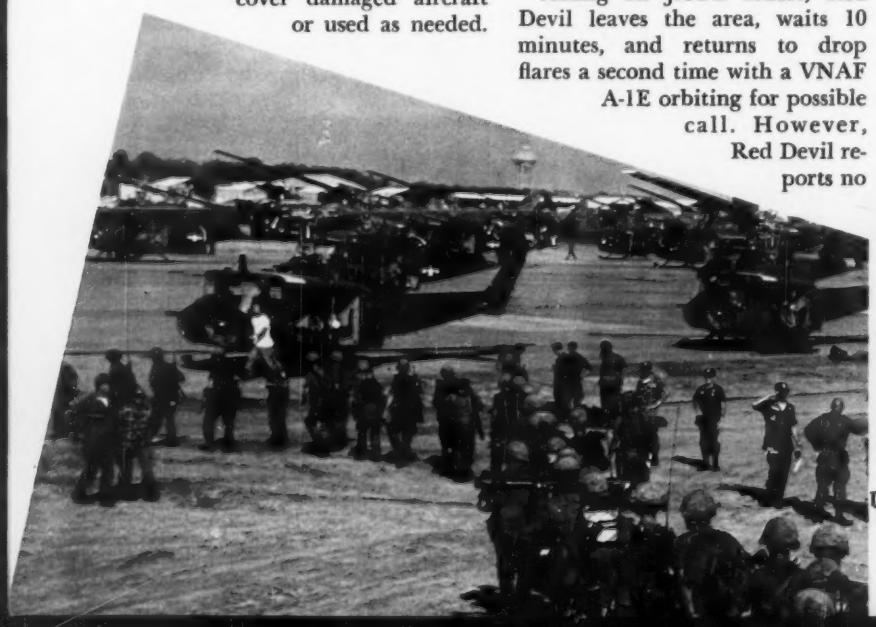
Acting on JAOC orders, Red Devil leaves the area, waits 10 minutes, and returns to drop flares a second time with a VNAF A-1E orbiting for possible call. However, Red Devil reports no visible targets or signs of life at the Ap Binh Chanh outpost. JAOC orders Red Devil to return to Saigon.

Corps staff recommends holding a state of readiness while a C-47 drops a reconnaissance patrol of paratroopers near Ap Binh Chanh outpost. Meanwhile, Long My outpost is ordered to deal directly with corps headquarters.

At 0110 hours the reconnaissance patrol is dropped slightly short of the intended drop zone and much closer to the Ap Binh Chanh outpost than intended. Although isolated in a marshy area across a canal from the intended drop zone, the patrol observes and reports heavy traffic of empty sampans moving east on the canal. It also discovers a concentration of some Viet Cong in a nearby lateral canal. Some Viet Cong are overheard discussing a pending attack, but no locations are mentioned.

0150—The patrol reports heavy canal traffic moving northwest. The commander of Long My outpost is alerted to this movement.

All involved in Operation Moonlight Train are given 10 minutes standby orders. Crews are with the ships. The aerial command post UH-1B (code name "Choo Choo") is airborne and JAOC scrambles Red Devil and two A-1E VNAF aircraft to take directions from Choo Choo.

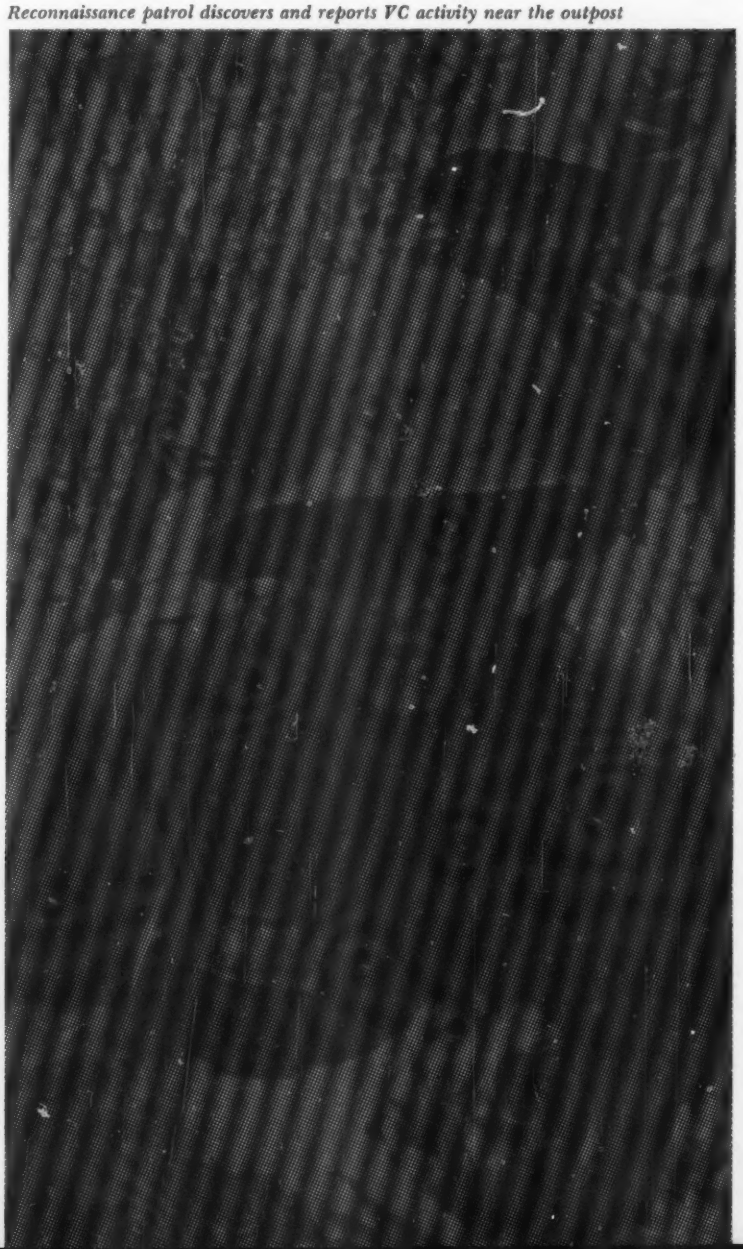


OV-1 (below) take off to search for enemy activity near the outpost while troops board UH-1s (left)

Operation MOONLIGHT TRAIN stunned the Viet Cong and opened a new chapter in night counterinsurgency operations

The action that had been reported at 0221 by the ARVN lieutenant commanding the Long My outpost is reported to the corps commander aboard Choo Choo at 0230 hours. In consonance with his senior U. S. advisor, the commander orders all Operation Moonlight Train personnel into preplanned action. Cloud cover is almost solid at 4,000 to 5,000 feet with no rain or noticeable wind.

Reconnaissance patrol discovers and reports VC activity near the outpost



Fifteen minutes later the air-dropped reconnaissance patrol reports that Viet Cong units are moving northwest across the canal. The Long My commander is ordered to cease firing illumination rounds. Troops manning listening posts are ordered back to the outpost. They report some movement and voices in the direction of the canal and a nearby village.

Choo Choo informs Long My that help is on the way and that helicopters will be used. Long My is requested to use a burning arrow-shaped pointer and tracers to point the direction of the enemy.

0315—the Blue Boy flight of troop-carrying helicopters is orbiting at the rendezvous point.

0321—Long My outpost reports it is under attack from the east. Automatic weapons and light mortars are being used against the outpost.

The CH-47 moonlight choppers are ordered to positions selected by Choo Choo. The fourth moonlight ship is to orbit in a designated area as reserve light source. The radar equipped TOC Caribou is flying a course at 3,500 feet and parallel to the canal on which the VC are moving. It has identified landmarks and is standing by to assist aircraft, either in trouble or by directing their route to the landing zone.

Mohawks are ordered to look for targets in the vicinity east of the canal and southeast of the Long My outpost while Red Devil drops flares.

At 0335 Long My reports it is now also under attack from the vicinity of the canal to the south. The report also advises that a 2,000-meter area to the east is suitable for helicopter landings.

Meanwhile the Wine Tree troop-carrying helicopter unit

joins Blue Boy unit at the rendezvous point.

Heavy tracer fire from Long My outpost, along with the flaming arrow, point south toward the canal and southeast toward the main enemy effort. Very little action has developed north of the outpost.

Choo Choo orders paratroopers dropped from a C-123 in an area north of Ap Binh Chanh. The Blue Boy unit is deployed to cover roads and canals to the west and southwest of Long My.

The CH-47s are ordered to provide "moonlight" on the canal and objective areas. Enemy troops are caught in the canal in boats and in open areas nearby. Armed helicopters are requested to approach these targets from west to east at 500 feet or below. "Moonlight" aircraft remain at 1,000 to 1,500 feet. The flare ship withdraws, but the A-1Es stand by, orbiting the area.

At 0350 a group of three UH-1B armed helicopters attacks enemy boats in the canal with machineguns and rockets. They are accompanied by a UH-1 mounted with a cluster of seven lights which provide a diffused floodlighting of the target area (see "Searchlight for Helicopters" in this issue). A second group of three Hueys (also accompanied by a floodlight mounted UH-1) attack the VC in the open area. The first group of UH-1Bs makes an additional run on the VC in the canal before withdrawing to refuel. The second flight of UH-1Bs attacks a suspected area at the edge of a woods near a bridge by the Long My outpost.

All heliborne troops move into the objective area. The Viet Cong begin a withdrawal to the east but are headed off by paratroopers dropped earlier north of Ap Binh Chanh.

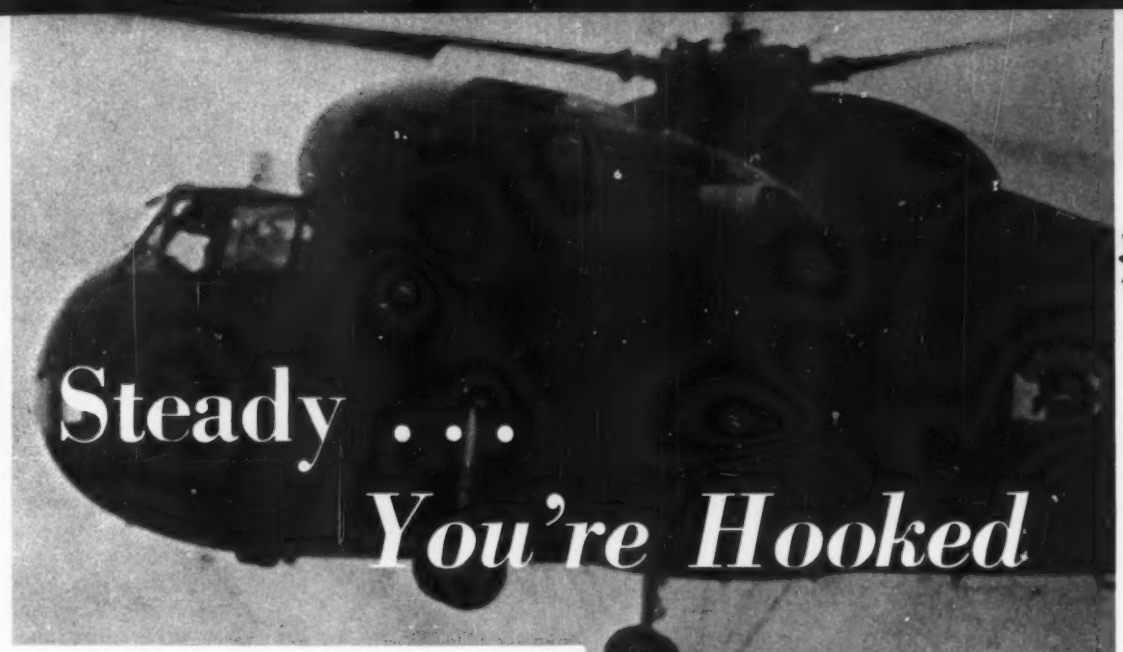
At 0410 all aircraft except the O-1 command aircraft, one CH-47 on station, and the A-1Es are ordered out of the immediate area. Outpost Long My is ordered to hold fire unless attacked. Red Devil is dropping flares in the vicinity of the outpost at 2 minute intervals. Five minutes later all signs of attack have vanished and the VNAF aircraft are released.

At 0445 ten Viet Cong ask for safe conduct for others to surrender at Long My outpost. An hour later first light breaks and all ARVN troops begin mopup operations in the area west of the canal and southeast of Long My. They report heavy Viet Cong casualties—the count is not yet complete.

0600—All participating units receive this message from the corps commander:

OPERATION MOONLIGHT TRAIN AN UNPARALLELED SUCCESS. IT OPENS A NEW CHAPTER IN THE NIGHT COUNTER-INSURGENCY OPERATIONS. THANK YOU, GENTLEMEN.

Mopup operations (below) following Moonlight Train account for prisoners (right)



Steady . . . You're Hooked

THE ENGINE comes out in short order. So do rotors and machineguns as the hookup crew is in the last throes of preparing a Huey for recovery. Soon, the great beast would come in all its cyclonic fury to whisk away the wounded bird. It will soon become the responsibility of the Direct Support Maintenance Company to ready it for combat another day.

Crack! Ping! Tiny explosions of machinegun fire rain down just as the screaming Mojave engines echo their arrival over the jagged peaks. Muzzles begin to heat as the crew returns fire while clumsily trying to extract the last piece of equipment.

The armed ship guys spew their covering fires. The giant swoops down over the load, its waist gunners spurting intermittent tracers into surrounding brush.

With rifle barrels still blazing hot two men leap atop the now riddled Huey beneath the 100 mile an hour gale created by the mighty Mojave. The deafening noise, the elephant grass blowing wildly as the entire earth shakes, the incessant wait for the thumbs up sign from the "man over the hole," face down in the belly of the suspended monster directing the pilot over the load—every muscle strains until hook and clevis meet. "Steady, you're hooked!"

Jump down—lie flat—clear. A few utterances, maybe a "choi oi" or two until translational chatters. The mighty workhorse staggers off. An eye out now for the rescuers. What a sight for burning eyes. All aboard. Next stop, Quang Ngai.

A-1E bombs VC emplacement concealed by heavy jungle. Target marked by forward controller.

Skyraider Support

Lieutenant David H. Price

ONE OF THE most demanding combat tasks performed by armed helicopter crews in support of efforts of the Republic of Vietnam is visual reconnaissance and target destruction missions within the communist strongholds in the forbidding jungles and wastelands. Those armed reconnaissance flights are necessary to prevent the enemy from massing his forces in these zones and to deny him the privilege of a safe area. To the fire teams these reconnaissances soon become routine but no less hazardous.

Try to imagine yourself in the fire team leader's position as you read this article. This story is true. Similar events are occurring in the combat experiences of nearly every armed helicopter pilot. Teamwork between services has grown from haphazard beginnings experienced here to a highly proficient and effective fighting team.

Here's the situation. You are an armed helicopter fire team leader whose principal area of operations is the vital III Corps area around Saigon. You are familiar with the area in which you are required to

conduct reconnaissance. You've done it before. It's old hat.

You know the dense jungle east of national highway 14 to be ominous and foreboding. You're required to lead your fire team into areas of suspected Viet Cong concentration trying to see something, anything, to alert you to the presence of the enemy. You know your job's important: to prevent the communist forces from massing units sufficient to knock over vital installations along route 14.

Song Be, Dong Xoui, Phuoc Vinh, Ap Bo Lar, Tan Uyen—you know the Americans there and you understand their concern. The dense jungle and abandoned hamlets of zone D contain VC units of regimental size, as well as headquarters and logistics points to support these units. You're concerned too. You've heard the heavy beat of .50 caliber machinegun fire directed at your aircraft; you've heard pilot reports of pink and white tracers visible even in daylight rising from the jungle's foliage.

The whole idea seems unnerving as you lead your fire team along the edge of zone D to the staging area. Upon arrival you're met by the senior advisor. He indicates he has something different for you today. You can just bet it's something different. It's hard to believe; it's always the same reconnaissance or "seek and kill" mission.

You grab your map and walk into the headquarters building. You're greeted by the rest of the staff. The order begins: The enemy situation is causing greater than average concern. A VC battalion is thought to be moving into a resupply and rest area to mass for an attack on one of the key installations. On this premise the senior advisor has requested and received a flight of four Skyraider A-1E fighter-bombers to support your reconnaissance.

Your mission: seek and destroy Viet Cong armed helicopter style, concentrating primarily on the area thought to contain the suspected battalion. You'll rendezvous with the A-1Es airborne at 1400. The U. S. Air Force forward air controller (FAC) assigned to this sector will be airborne over the operational area in his O-1. You'll acquire the targets, the FAC will approve the use of the fighters, and you'll both direct the fighters as they strike.

Man, we are getting somewhere. You don't mind so much anymore. At last you have a destruction capability to supplement your own weapons systems. You can tackle larger targets now, fly a little lower than usual, and the .50 caliber machineguns, if they miss you the first time, won't get another chance to fire at your aircraft. You coordinate frequencies and talk to the FAC about the basic things you need to know, such as ordnance capabilities of the fighter-bombers, airspace restrictions, proper ordnance for the proper targets, and civilian areas which must be avoided to prevent injury to innocents.

Takeoff time is 1345. Fifteen minutes from the target area you rendezvous en route with the fighters. The FAC briefs the TAC aircraft on today's mission and asks the fighter-bomber commander what ordnance is aboard.

Target area dead ahead. Heavy jungle, two or three small clearings. You notice something irregular in one of the clearings: a Viet Cong victory garden by a small stream. Yep, they're here all right—but where? You're determined to check the clearing closer on your low recon. You pick the

Your mission: seek and destroy Viet Cong, armed helicopter style, concentrating on area thought to contain . . .

A-1E hits VC target (left) after receiving strike instructions from a fire team of Hueys (right) which begins a poststrike recon

densest jungle canopy over which to make your descent to contour. Another check with the fighters. They're orbiting overhead in position to answer your call. The FAC says he'll keep you in sight.

Hustling down to contour you begin the planned flight route. No fire received as yet. But you know they're in there. Clearing ahead; you plan to stay at least 50 meters to its edge, not to fly over it. You remember with a smirk how at Fort Rucker you were required to keep a forced landing area within reach. You just hope and pray you don't need one, for here you are at contour over two or three layers of jungle canopy. Flying over the clearing causes your aircraft to closely resemble goldfish in a bowl, and the Viet Cong tend to take the actions of a cat.

So far so good; nothing unusual in the clearing. You plan to check it again on your flight out, but from a different direction. Garden area is next; you check this closely. As you pass close to the garden you see a well used bridge, and the water in the creek has recently been muddied. Someone just left in a hurry.

This calls for another pass—with faster airspeed and more evasive action. You roll in; you're on the very edge of the clearing. The door gunner probes the opposite treeline with machinegun fire. Suddenly, "Raider 22 receiving auto weapons fire, 3 o'clock, the treeline!" Your wingman has just been shot at.

Well, now you know. The Air Force jockeys for position. The wingman has marked the area with smoke. You call the FAC and he approves the use of the fighters. Fixing the target with your machineguns, you issue strike instructions to the fighters simultaneously. You've increased your altitude slightly. The target area suddenly erupts with muzzle flashes. There's a .50 caliber in there! You dive for contour cover and report this new development to the fighters now inbound. You get out of the way off to the side, close enough to observe and correct each fighter's pass.

You've been jockeying for position to begin poststrike analysis as soon as possible after the last fighter is off the target. You're contour again and the last fighter is rolling in. You close with the target area. You know you must get in and out in a hurry and as soon after the last fighter as time will allow. The bombs go off and you're over the target; smoke from the strikes fills the cockpit. At 80-90 knots you feel as if you're over the target for a lifetime. Boy, you could sure use a Mohawk now. Seems to you it would be an ideal ship for poststrike recons.

You draw no fire on your reconnaissance and return to altitude for the smoke to clear. Evidently the Viet Cong have been destroyed or routed. It was a beautiful strike. You make one high 1,500 foot pass over the area to observe the craters in the canopy. Hey, there's a hootch down there and another, and another. This target is far from being developed and destroyed. You descend for a low recon. You're excited but you know that to get ahead of yourself can be fatal to you and your fire team. You remember the cardinal rules of armed helicopter employment and all your experiences these past few months.

You position the fighters and inform them to begin their attack should they observe white smoke thrown from either of the fire team's aircraft. You know you're

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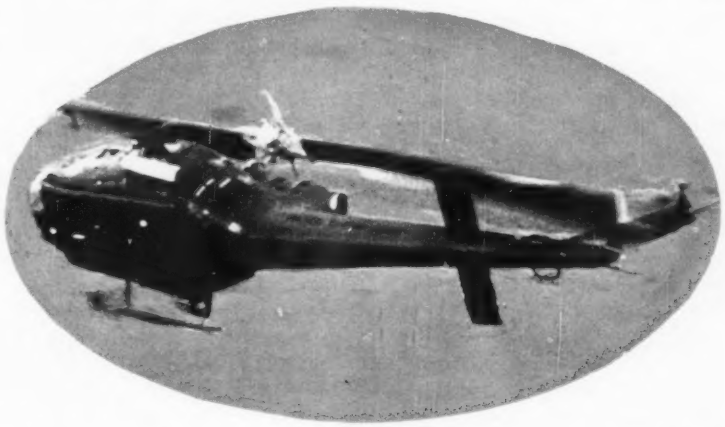
Lt Price is an instructor, Aviation Armament Division, Dept of Tactics, USAAVNS, Ft Rucker, Ala.

vulnerable while reconning these craters. You're over the target area. The area is a complex of well constructed storage sheds and warehouses. This must be one of the supply points and the battalion must have been present when discovered by your fire team.



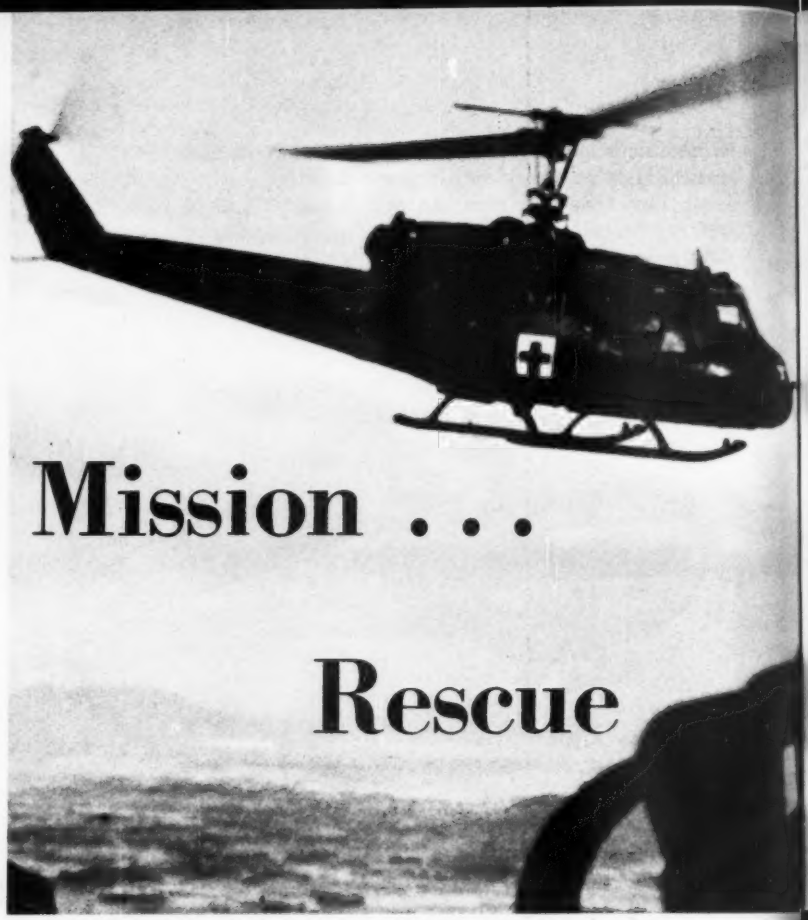
You report all this. On a second pass you mark the area with colored smoke grenades, describing each individual target to be destroyed within the target area. You ask the FAC to analyze this information and determine if the fighters on hand can do this job. You recommend that the FAC control the amount of ordnance to be expended from the fighters, as it is a critical factor now with such a large destruction mission.

Your fire team starts to seal off the area by strafing the outskirts. The VC are undoubtedly moving by now, having been discovered and hit hard. The FAC agrees and retains control of the fighters. He informs you that he will request additional air support.

You're low on fuel and return to the staging area. You feel good. You've got valuable information on the enemy and you've developed a target worthy of additional air strikes, maybe even a thorough ground operation to verify the results of the Air Force work.

But most of all you've taken a giant step in extending your reconnaissance/destruction capability. The Army and Air Force have developed and executed an outstanding method of reconnaissance and instant destruction so vital in this kind of warfare where the enemy is extremely elusive and second to none in the execution of guerrilla warfare. You've got to find him, fix him, and destroy him immediately or he will vanish.

The echo of the bombs can still be heard to the east as you step out of your aircraft. It has been a good mission; you've been involved in a highly successful SKUNK HUNT.



Mission . . . Rescue

William H. Smith

EVEN THOUGH many aviators in Vietnam go on two or three missions a day, desk types like me sometimes have trouble getting in as much flying as we'd like. One way to remedy this is to volunteer to fly emergency medical evacuation missions.

One morning I was scheduled to go on a medical evacuation to an outpost just north of us. Nothing exciting, one of the defenders had a bad tooth that needed to come out and another had a stubborn case of Vietnamese curse (a local type of dysentery) and needed something besides the usual dose of Polmagma to get rid of it.

The rest of the outfit was going "fishing" to the south. Some VC had been reported hiding in a mangrove swamp, and the commander of a nearby ARVN (Army of the Republic of Vietnam) unit hoped to flush them out.

As I settled for a landing at the outpost, I heard the report of a weapon of some sort. Before I realized what was happening I heard another, and this time could hear the whine of bullets over the noise of the chopper. I got out of there but quick.

As soon as I was out of range I called the outpost. They said we had stirred up a mess of VC who were hiding in a cleverly concealed trench between them and the river. From my vantage point I could see the L-shaped trench about 150 meters long. They had apparently dug the trench during the night and now had the outpost under heavy fire.

We immediately flew back to the home field. En route I contacted the old man and told him about being fired on. He said he had heard from the garrison just a few minutes before and was making plans to help them. He asked me to come in as soon as possible because he would probably need every helicopter in the area.

When I shut down, the fuel truck hurried over to service the helicopter. Other Hueys were getting ready to take off. I intercepted the old man as he walked to his ship. He said that the "fishing" expedition was being diverted to relieve the outpost. He was taking some gun ships to the area to keep the battalion sized enemy force under fire while the Eagle Flights (airmobile ARVN) landed.

He questioned me in detail about the size and location of VC at the outpost, possible landing areas, and type of fire I had received. When he was satisfied he said he would like for me to fly in the radio relay aircraft (O-1F Bird Dog) so I could see the whole operation. Then I could report to him any new VC tactics or reinforcements being brought up. He also wanted me to look for any movement that might indicate VC positions we didn't already know about.

On the way back to the outpost I had time to think about my mission. Being able to fly over the area and see the whole battlefield spread out like a giant sandtable is a great advantage. But it will be much better when observations are made by television cameras and watched by the CO in his own tent or aerial command post.

We had just taken our position high above the outpost when the old man and his gun ships arrived to mess up the VC's plans. The

ships immediately received heavy fire but the best I could tell it was mostly light caliber stuff.

The gun ships braved the fire and went to work. The trenches made it a little hard, but the pressure was taken off the outpost as more and more VC concentrated their efforts against the hated American helicopters.

In the distance I could see more helicopters coming in. This would be the first contingent of Eagle Flight, about 70 ARVN troops. It had been exactly an hour since the VC first attacked, and here was help already. It would have taken many hours for these same troops to come in by land.

Getting the troops into a suitable landing area was not easy. The helicopters wanted to get close to the VC since it would reduce ARVN exposure time to VC fire. But if they came in too close they would be subjected to heavy fire.

The old man made several passes and finally settled on a cleared area to the right of the VC's L. Between the area and the L was a line of palm trees and low scrub that would provide a screen. He guided the Eagle Flight into this area, making sure they came in from the blind side. All the while the armed Hueys kept up fire on the VC trenches.

No sooner had the first UH-1B set down than it received fire. The VC had stationed a few men in the wooded area. According to radio chatter one aircraft was hit but not seriously. The others were saved when ARVN troops jumped out of the aircraft and ran across the field, forcing the VC to retreat.

Once the VC had been driven out of the woods, the Eagle Flight advanced on those in the trenches. It was hard going but they made steady advances, helped by the gun ships that kept the VC pinned down.

ARVN troops had advanced about 700 meters when I noticed that one by one the armed helicopters started leaving the area. They had used up their ammunition and were returning for more. Eventually only two Panther (.50 caliber) UH-1Bs were left. They orbited above the operational area, attacking specific targets on call.

With loss of fire support from the armed helicopters, ARVN troops were pinned down by the intense automatic weapons fire. As far away as I was, I could see that they were suffering an alarming casualty rate.

Panther UH-1Bs are not primarily designed for general ground support work. But it was

Gunships (below) keep VC pinned down while ARVN troops (right) jump off

necessary that the ground force receive fire support, and the .50 caliber team didn't hesitate. They made pass after pass and soon ARVN troops were able to move again.

But the going was still rough and didn't improve until the other armed Hueys returned. When enough came back to be effective, the VC were again put on the defensive and ARVN troops continued their attack.

The second lift of friendly troops arrived shortly. They tried to land closer than the first troops, but it didn't work. The VC were able to concentrate their fire on them, and the trenches kept the supporting UH-1Bs from stopping it.

The landing was aborted and a second approach was made from a different direction. This time it was successful. As soon as the troops had disembarked, the troop-carrying helicopters went back for more men. The third, fourth, and fifth lifts arrived at 40-minute intervals.

When the fifth lift landed, the VC began losing heart. Some stayed and died at their guns but most tried to get away. They bolted from their trench and a few managed to escape into the woods. The rest were shot down as they ran across the open field.

Now that the helicopters were no longer needed to suppress fire, they landed and took on the role of medical evacuation. One American advisor and 19 ARVN soldiers were brought back for medical treatment.

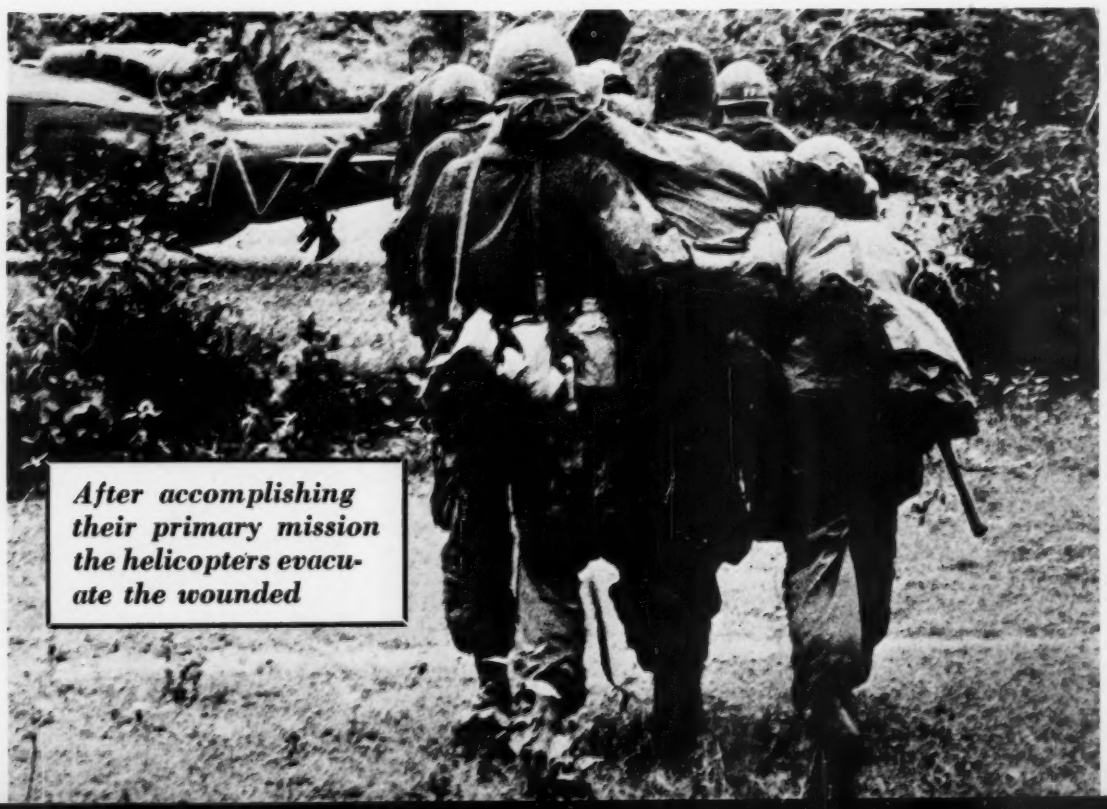
When the operation was over the ARVN commander made a thorough search of the area. He found one ARVN soldier who had been hit several times by automatic fire and had apparently died on the spot. The trench and field around it were littered with 56 dead VC.

In the communist trench ARVN soldiers found a 60 mm mortar, 2 BARs, and 24 individual weapons of various calibers. We had expended 185,600 rounds of caliber 7.62 ammunition, 695 2.75-inch rockets, and 4,600 rounds of .50 caliber.

Eight helicopters participating in the engagement were hit, but none were put out of action. All were able to fly to our home field, and within a few hours they were repaired and ready for the next assignment.

This engagement illustrates the importance of immediate action in response to current intelligence. In guerrilla type warfare the enemy's usual course of action is to make surprise attacks for very short periods and withdraw before friendly troops can come in to help. Airmobile troops move so fast the enemy is unable to withdraw.

Oh yes, I did make that medical evacuation—the next day.



After accomplishing their primary mission the helicopters evacuate the wounded

About This Special Issue

THIS ISSUE of the DIGEST is devoted to Army Aviation's mission in Vietnam. In the group of short articles which follow we tried to include information about as many different operations as possible. Some important activities have been omitted, not because we chose to leave them out but because we lacked coverage.

If you are serving in Vietnam, perhaps this issue will help acquaint you with the activities of other units. If you are expecting orders to Vietnam, we hope it will help you prepare for service there. Regardless of the unit to which you are assigned or the job which you do, members of the Army Aviation team in Vietnam will be as professional in action as they are brave.

Army's newest and first airmobile division

1st Cav in Vietnam

FOR 22 years the 1st Cavalry Division has served as an American bastion in the Far East. It has a proud heritage to live up to, and is doing just that in Vietnam.

As the Army's first TOE Airmobile Division, the 1st Cav was deployed to Vietnam in late July from Fort Benning, Ga. A few months before, the colors and name of the 1st Cav (on duty in Korea) had been exchanged with the 2nd Infantry Division's (see "1st Cavalry Division (Airmobile)," DIGEST, August 1965).

Although not formally composed as an Army division until September 13, 1921, the 1st Cavalry Division traces its ancestry and traditions to the days of the pioneers' great sweep westward to California.

Two battalions of the 7th Cavalry which fought under the leadership of Col George A. Custer at the battle of the Little Big Horn in 1879 are members of today's 1st Cavalry Division.

The division's first mission was to patrol the land along the Mexican border. During the depressed '30s the 1st Cav was responsible for training Civilian Conservation Corps youths. In the early '40s it was preparing for war.

The division was ready when bombs fell on Pearl Harbor, but its first call to action came in 1943. The Army ordered the cavalrymen to turn in their horses and sail to Camp Strathpine, Australia, as a dismounted unit. In 1944 they stormed ashore at Los Negros Island in the Admiralty chain.

Island-hopping through the Pacific the division scored the first of three notable "firsts" when it swept in ahead of all U. S. Forces and liberated Manila.

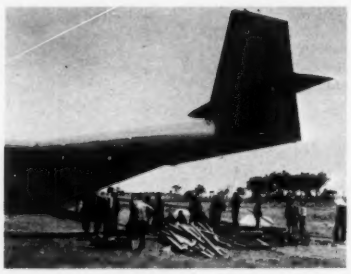
In 1945 the division, accompanying Gen Douglas McArthur, became the first U. S. unit to enter Tokyo.

A month after fighting broke out in Korea in 1950 the 1st Cavalry Division played a major role in turning the tide on the invading North Koreans and were the first U. S. soldiers into Pyongyang, the capitol of North Korea.

After the Korean War, the 1st Cav spent six years in Japan before being assigned to duty along the Korean DMZ, its last station before being restyled to conform to airmobile specifications.

In Vietnam the 1st Cav's initial action was in support of the 101st Airborne Division in a clearing operation near An Khe. In November the 1st Cav locked horns with what was reported to be elements of the North Vietnamese army in the Ia Drang valley near Plei Me. In the midst of a Viet Cong stronghold the men of the 1st Cav dealt the enemy a stinging blow. The proud heritage remains unblemished.

Joint Effort



Teamwork

Soldier looks for airdrop of supplies

A UNIQUE resupply program in the Republic of Vietnam has matched the Army and Air Force in a joint operation which accounted for over a million pounds of cargo moved during the first full month of operation.

Located 220 miles northeast of Saigon on the South China Sea is a detachment of U. S. Army and Australian Caribou that team with U. S. Air Force C-123 planes to perform this unusual duty.

This joint team resupplies all Special Forces camps in an area over 500 miles long and ranging from 50 to 250 miles wide.

Where the Viet Cong are still active, Vietnamese Air Force Skyraider fighters are employed for protection of delivery aircraft. The Army and Air Force pilots speak highly of these men who rendezvous with cargo planes and escort them in for the off-loading operation.

One pilot said, "It's amazing how much respect the Viet Cong have for these fighters. When they see them escorting us, they are very reluctant to break up the show with ground fire."

Also helping to provide protection in hostile areas are armed UH-1B helicopters. They provide close cover when one of the cargo planes must land, off-load, and take off. During this period, the choppers hover close above the airstrip looking for enemy who might decide to get into the act.

Normal runs for the planes average one long-distance and several short-haul runs per day. When moving large, heavy loads such as ammunition, the planes will operate in a shuttle manner, taking a full load each trip.

For the men in isolated camps, the sight of the cargo planes is pleasant indeed, since for most it's their only contact with the outside world. The pilots and crew therefore, try to bring the latest news from adjacent units.

Professionalism and skill of the pilots making these supply runs is unquestioned. They must know all the factors of each Special Forces camp, including weather conditions, runway peculiarities, and all the approaches that can be used in bad weather.

Whether it is an Australian pilot, American Army Aviator or Air Force pilot, they all know that these supplies are the backbone for the Special Forces men in these camps.

. . . and gets them with on-the-spot delivery

For crewchief and gunner it's

Long Hours

FOOTSTEPS OF the security guard stepping on rocks and sloshing through mud puddles were the only sounds heard on the airfield. UH-1Bs were lined up against the dark grey background of the rising sun.

A ghostly figure glides slowly toward the helicopters, pausing only to put out his cigarette. He takes a few more steps and opens the sliding door of one of the helicopters. A loud thud breaks the silence as his flak jacket and helmet hit the steel deck.

The security guard signifies that everything's all right. As a small light goes on in the helicopter, the outline of the man becomes clearer. Now it is easily seen that the helicopter is an armed ship. Its coaxially mounted machineguns glisten in the bright light.

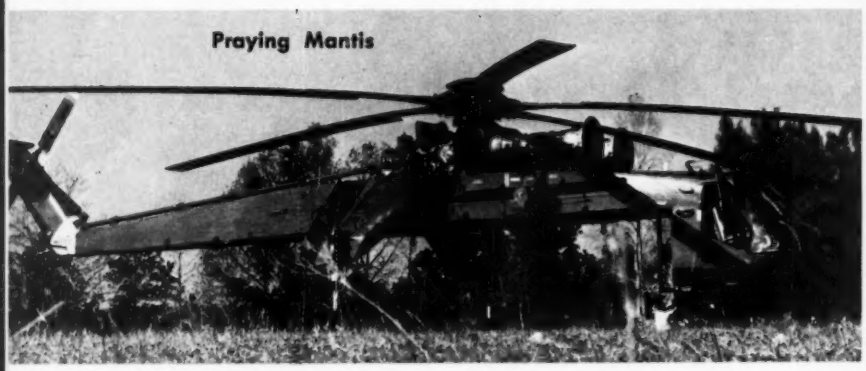
Another man walks to the aircraft, straining under a heavy weight in his arms. A loud metallic clank echoes through the air as four machinegun barrels and two M-60 machineguns are dumped on the helicopter's deck. The four barrels are inserted into their receivers while one machinegun is hung on each side of the Huey in the open doorway.

As the sun rises higher on the horizon the aircraft and its guardians are plainly visible. The first man now climbs slowly up the side of the helicopter and checks the rotor blade and engine compartment. Satisfied that all is in order, he climbs down and checks the gauges located along the side.

He walks to the rear and unravels and releases the rotor blade tiedown hook. The heavy blade tips lightly in the early morning breeze as it moves slowly in a circular motion.

A jeep pulls up alongside the aircraft and its two passengers dismount and carry helmets, flak jackets, sidearms, and mapcases into the aircraft. An hour has gone by since the first man, the aircraft's crewchief, arrived. The gunner has adjusted and checked the aircraft's armament system, as well as loaded all weapons for immediate use.

Looking back and nodding his approval to the crewchief and gunner, the Huey commander starts the engine for the day's mission. He knows that regardless of the time their mission is completed this evening the crewchief and gunner will spend an hour or more readying the aircraft for the next day.



Praying Mantis

Vietnam Heavyweight

WHY IT LOOKS like a praying mantis," is the usual exclamation heard when one sees the CH-54 "Flying Crane" helicopter for the first time. It does indeed look like a praying mantis. Despite its ungainly appearance, the Flying Crane has become the heavy workhorse of the 1st Air Cavalry Division.

With two 4,000 hp turbine jet engines, the giant can lift some 10 tons of material by sling. Use of a winch with a 100-foot extension potential allows the crane to lower its sling load into heavy undergrowth that would defeat an ordinary load-carrying helicopter.

In what is known in the division as a "people pod," a van-like device, the CH-54 can carry 67 fully combat loaded troops. Another use for the pod is as a mobile command post or communications center.

But it is preferable not to use the pods for general utility work because the weight of the pod must be subtracted from the total payload. The cranes work best when using their sling-loading capability.

This unusual looking aircraft has become the sensation of Vietnam.

People pod

Pathfin

THE TAY NINH Mountain peered at them moodily, almost with suspicion. It had watched the five Americans all that morning, and seemed to know something was in the offing. As if in answer to its puzzling, a cluster of dots formed along the horizon, like a swarm of bees.

These dots slowly evolved into an aviation company of 21 UH-1Bs. They were soon joined by UH-1s of another aviation company and seven Vietnamese Air Force (VNAF) piloted CH-34 troop carriers. Meanwhile, seven armed UH-1s were prestriking at the assault position.

Now the five Americans went into action. They were the Pathfinder Team, the men who set up the landing zones (LZ) and pick up zones (PZ). The lieutenant in charge pulled the pin of a green smoke grenade and tossed it high into the air. The emerald vapor told the pilot of the lead ship where to land, all according to preflight briefing.

A specialist kept up radio contact with an O-1 reconnaissance plane circling the area. It reported any threatening advance of Viet Cong guerrillas known to be in the area. Standing by the radio was a liaison officer. Not officially a member of the team, he was

finders

there to coordinate the operation and "just to see how it's done."

Two of the pathfinders had "staked down" panels, signal strips of orange nylon, in the form of the letters T and H and were guiding in the lead ship of the two helicopter flights with hand signals.

The Hueys hovered and settled, whipping the marsh reeds with the air from their powerful blades. Now the race was with time. Vietnamese Army (ARVN) troops of an airborne brigade ran and boarded the ships; 320 men took off with first lift. Within minutes the UH-1s and the seven VNAF troop carriers "flew up the T."

The first two lifts carried out over 600 men, the third and fourth lift raised the total to approximately 1,100 ARVN troops.

The lieutenant is the only qualified Pathfinder in this operation. The rest of the team has done little or none of this type work before. Their work is strictly voluntary; all of these men have regular jobs.

The contribution of these men is vital and worthy of considerable praise. But when it really matters, when it really counts, all the credit they need is the confidence of the pilots, and they have that.

Low, Slow and Reliable

UNDER THE malevolent sun in Vietnam, a concrete rectangle rising a foot out of the ground beside the door of an aviation company orderly room says, "The OTTERS NEST – Welcome."

"We don't think our job is glamorous, but a lot of people have that impression about flying," remarked the commanding officer.

"Several regions in this country depend on us for supply, evacuation of wounded, and courier runs. These hamlets and outposts in Viet Cong territory are accessible only by air. We have to fly our Otters in. That makes our job important."

A rugged-looking aircraft with a sturdy airframe built for battering work, the Otter is not a pretty ship. It looks disproportioned with its long wing and wing struts, gangly landing gear and larger wheels, plus its extended chubby fuselage and squat tail assembly.

But the U-1A does the work for which it was designed. It flies low and slow; above all it is reliable.

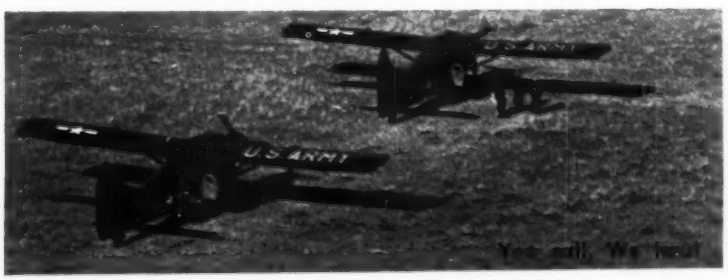
The company is called out frequently for night medical evacuations. This work is hazardous because the Otters have to fly into unlighted airstrips, often on the

fringe of thunderstorms and over mountainous country. They have landed by mortar flare many times. Getting shot at by Viet Cong ground fire is part of the business.

During last February's Viet Cong mortar attack at Pleiku, two planes in the company were called in to air evacuate casualties. Although it meant flying at night into an area still "hot" with VC, many wounded were flown safely to medical facilities.

Otters hauled artillery and small arms ammunition to the outpost at Dong Xoai when the VC had it under attack. They resupplied it after the fight. Close calls under fire were common.

The Otter is ideally suited for its mission: support of Army Aviation in the Republic of Vietnam.



Haul Men, Machines

WHAT IS DUTY like with a Caribou Company in Vietnam?

An average day for the crew and pilots starts at 0500 and ends at 1900, seven days a week. Predawn hours will find crews busily preparing aircraft for flights throughout the Republic of Vietnam. At dusk crews make final checks and bed down for the night.

Army crews of one aviation company average eight to ten flights per day. Their total deliveries for a recent month included 1,508 tons of cargo and 14,944 passengers.

Terrain, enemy situations, and climatic conditions make flying supply missions dangerous. Many Caribou pilots have made "matchbox" landings on strips not much larger than a football field. This factor increases the dangers of supply missions to the many remote compounds throughout the Republic of Vietnam.

Not only does the Caribou company land supplies at airfields but they also airdrop a large percent to remote Army Special Forces camps throughout the delta. Ninety-five percent of all drops are recovered, which is exceptional even under ideal conditions but extraordinary under combat conditions.

"Lolex" procedures are in common usage. Lolex drops are made from 3 to 15 feet above the ground, and supplies can be placed within 20 yards of a given area.

Additional missions include supplying airplanes to an airborne unit for jumps, medical teams for evacuations of U. S. and Vietnamese personnel, flare drops, and radio relay.

Despite the hazardous duty imposed by flying in support of Army Aviation missions, safety of operations has not been neglected. One company had flown over 13,000 accident free hours during 1965. They are confident of reaching their 1965 goal of 15,000 accident free hours.

Professionalism in doing their jobs, individually and as a team, gives every member of the company assurance that they are on the right track.

Carrying on 20 year tradition of giving ground commanders airborne eyes is role of

O-1Fs in Vietnam

ARMY AVIATION'S newest unit insignia on aircraft over the Mekong Delta are crossed shotguns. They belong to an O-1F Bird Dog company.

Mission of the "Shotguns" is to provide ground commanders throughout the delta with greater surveillance and target detection capabilities. It also includes such missions as artillery adjustment, radio relay, psychological warfare operations, target marking, flare drops and aerial resupply.

Their light fixed wing airplanes are able to operate out of relatively unimproved airstrips, and are permanently located at such strips which offer adequate security.

An aviator and airplane are assigned to different areas in the delta and live and operate with U. S. advisors. Each Bird Dog carries a trained Vietnamese observer in addition to the pilot, and each has constant communications with his separate operations centers.

By keeping on the alert for Viet Cong movements and buildups and quickly calling in fire support, "Shotguns" are rapidly proving to be an invaluable addition to the mission of supporting the Republic of Vietnam.

Heap Big Little Scout

IN THEIR FIRST 42 days in Vietnam the 1st Air Cavalry Division's helicopter reconnaissance squadron flew 567 combat missions.

"We often fly day and night trying to locate the enemy and we've had as many as 18 pilots fired on in a single day," one platoon leader said.

Another pilot remarked, "At first I used to get a little shook up when the Viet Cong would fire at me, but after a while you get used to it and it doesn't really bother you."

Flying the OH-13, which has no armor protection, is like sitting in a fishbowl just waiting to get cracked. Visibility is unlimited but the pilot and observer feel kind of naked sitting out there in the bubble.

So far the helicopters have held up under fire better than the pilots thought they would.

"They're a little slow. They'll only do about 70 knots, but they're a small target," one pilot ventured. "When we first started working with them we thought we'd been assigned to the suicide squadron. But our experience with them has been fine."

Usually the Sioux fly in teams of two, one equipped with 7.62 mm machineguns on each side and the other carrying eight 2.75 inch aerial rockets.

On scout missions forward of the infantry troops the Sioux try to get a fix on the enemy. Their job is a lot easier when the Viet Cong fire on them because then they can pinpoint the enemy in a matter of seconds and call in armed Hueys or artillery support.

A platoon leader stated, "Every day we are proving the advantages of an airmobile unit in this kind of war."

Chinooks Accept Challenge

LIKE ITS World War II numerical counterpart the C-47, the CH-47 is proving itself to be the workhorse of the 1st Air Cavalry Division.

Since their arrival in Vietnam, Chinooks have flown night and day carrying loads that vary from 105 mm howitzers to pigs, chickens, rice, downed helicopters, and medical evacuees.

According to the battalion operations officer, unit Chinooks fly an average of 850 missions per week carrying 550 tons of equipment and 1,500 passengers.

With the many hours the Chinooks spend in the air, maintenance can become a real problem. Battalion aircraft repairmen work with a real sense of urgency.

Sixty percent of the maintenance performed on the aircraft is done by the helicopter's own crewchief and flight engineer. Most of the men work 14 to 16 hours a day to keep their ships in top running order.

Ne'er Forget

Major Milton P. Cherne

TWO HEADS are better than one" is an oft-used saying. When both heads appear on the same object the saying becomes debatable. Some would say that you really have nothing but a two-headed monster.

Be that as it may, you can add to the problem by making "it" look like a common tropical fruit, designing "it" to operate in the arctic, employing "it" near the equator, and naming "it" after a glutenous animal.

Seemingly, with a beginning such as this, it would be improbable that fame and success could ever be achieved. However, the Hog—two-one (CH-21) not only took part in epochal events, but personally wrote a few chapters for people to ponder. The banana-shaped chopper was known and identified worldwide. Her picture appeared in print from west to east and north to south. Printed boldly across her sides in huge block letters was U. S. ARMY.

Newspapers, television, magazines and radio covered her exploits in Vietnam beginning in December 1961. Even the Viet Cong acknowledged her presence with crude drawings which were distributed to their better gunners and regular units.

Some people, unfortunately, never have the opportunity to face a "moment of truth." Some, unfortunately, have a moment of truth and find they are not capable of handling the situation. They are not prepared: do not have the intestinal fortitude to measure up to the task at hand and must back away from the challenge. To face such a situation and to surmount all obstacles incumbent with a mission is to experience a unique sense of real accomplishment and personal satisfaction.

If just one of her heads had a memory, she could remember 22 December 1961 when she blazed her way to fame during the *first* U. S. Army heliborne assault in the Republic of Vietnam. She could recall the steaming jungles and elephant grass; the flooded rice lands of the Vietnamese delta area; her personal wounds and the agony of the wounded soldiers she evacuated; names like Pleiku, Da Nang, Na Trang, Ap Bac, Soc Trang, My Tho, Cau Mau, and other strange sounding places.

Fame is short lived and success can only be measured by what remains after you depart. When you are emulated after your departure, or when your accomplishments become a new set of standards, or when your meager successes are building blocks for bigger and better things, then you have been successful.

So call her a two-headed monster if you will, or a gas guzzling Hog, but ne'er forget, ole CH-21 faced her moment of truth, tasted the sweet fruit of success, and paved the way for the future.

PSYWAR Effective

IN A WAR IN which the contested territory frequently lies in men's minds, words count heavily. High priority has been given in the Republic of Vietnam to a different kind of war. Its weapons are loudspeakers and leaflets; its soldiers are young Vietnamese girls and men. Called PSYWAR, it is proving very effective.

The Vietnamese Information Service (VIS) broadcasts its "Chieu Hoi" or "Open Arms" program which promises the Viet Cong complete amnesty if they surrender to government forces. It asks villagers not to cooperate with the enemy and warns them to keep clear of target areas during air strikes.

PSYWAR is not entirely a Vietnamese show. Rather, these operations are those of close cooperation between Americans, Vietnamese, and Third-Country advisors. On a recent mission, a U. S. Army helicopter crew carried two young girls and a man, employees of VIS, and a Philippine Army advisor over War Zone D, north of Saigon.

Each speaker ship has eight large megaphones mounted on one side. An armed escort flies nearby, ready to suppress enemy fire. It will attack only on orders from the PSYWAR officer in the speaker ship. Only he knows the sector well, and the mission must not be jeopardized by placing fire in a friendly area.

As the helicopter slowly circles a few square miles of farmland, the two girls take turns at the microphone. The Philippine PSYWAR officer drops the leaflets.

The VC do not like this brand of war. On each trip the helicopters are fired upon. Sometimes crewmembers are wounded, but PSYWAR is necessary if men's minds are to be won for freedom's side.

Airborne Radio Relay Teams

HOW DO commanders at the front of a division assault, which may be as much as 100 miles distant, communicate with higher headquarters?

Radios small enough to be carried by airmobile Army troops cannot be used effectively at ranges over 30 miles.

The solution worked out by the signal battalion was to establish five airborne radio relay teams, two mounted in CV-2B Caribou of the 17th Aviation Company and three in their own UH-1D helicopters.

Nine men from a company in the signal battalion comprise the division Airborne Radio Relay Team.

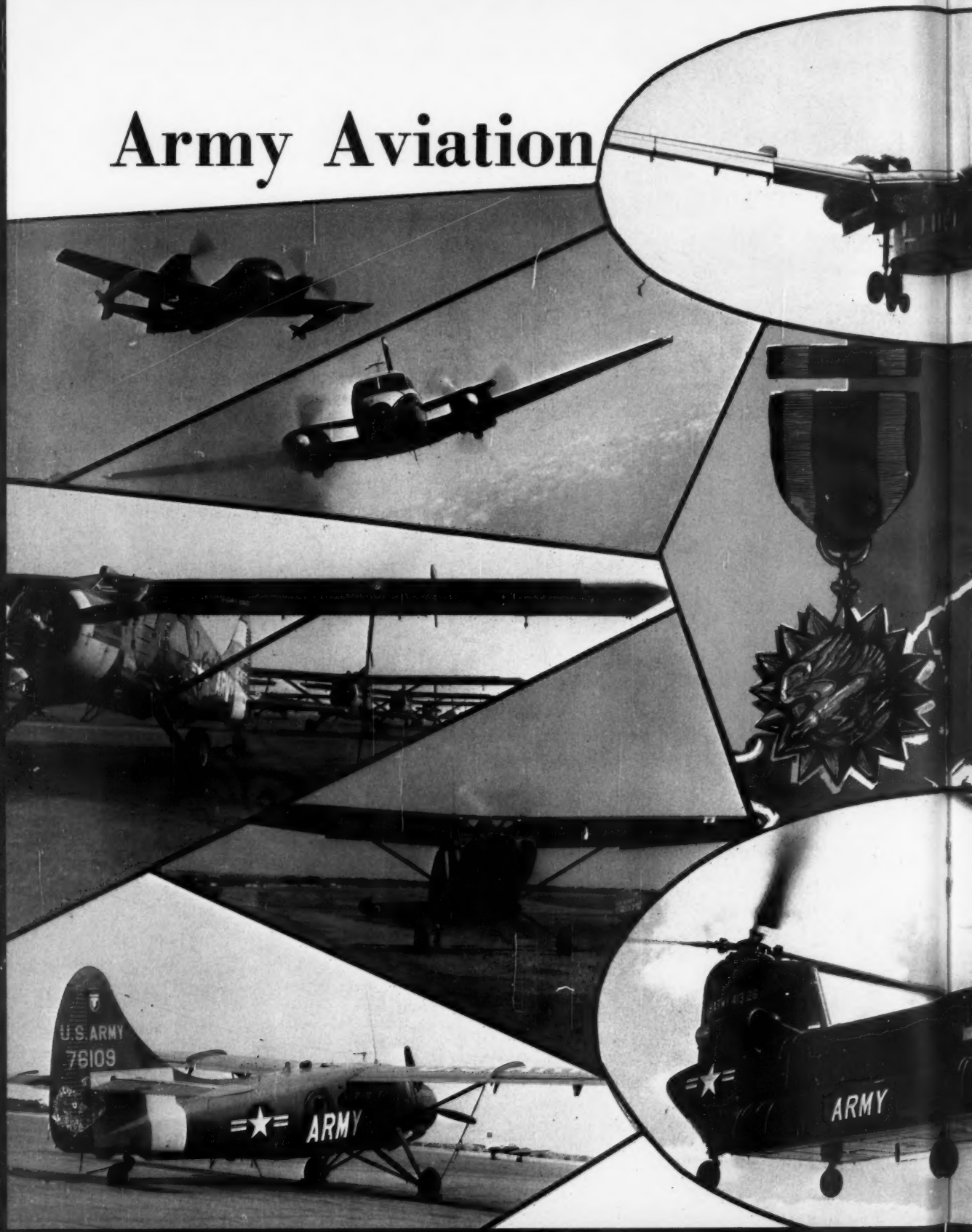
Each of the two Caribou teams consist of three men, allowing one man to rest while the other two operate the equipment on flights which may extend up to 12 hours.

Each of the Huey teams has one man who must work his equipment for up to four hours at a time, the maximum cruising period for the helicopter.

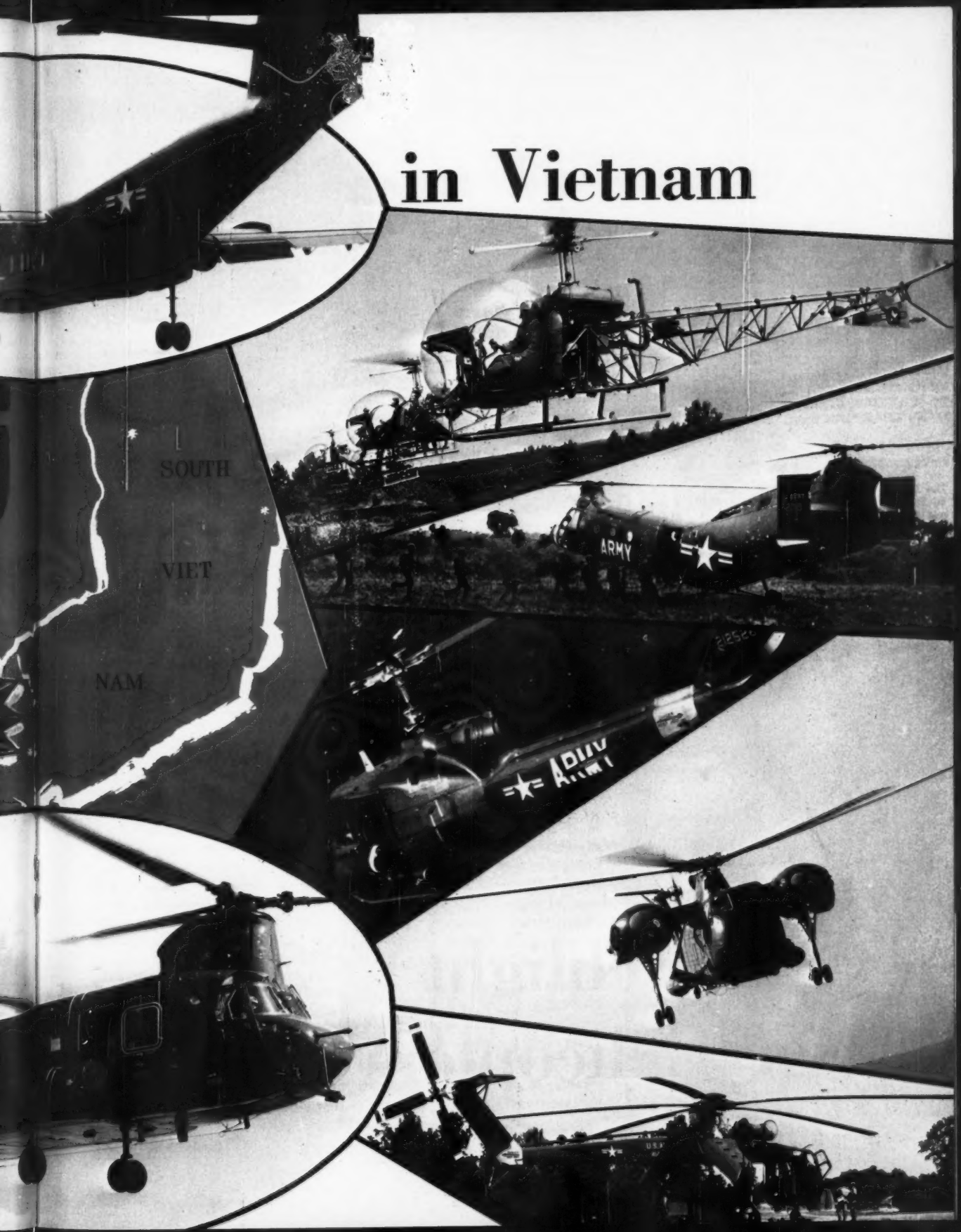
"During an operation we try to keep at least one of the Caribou and two of the Hueys airborne at all times," the team leader said.

His equipment increases the range of the FM family of radios up to 100 miles by retransmitting signals received on one frequency, amplifying them and transmitting them on another. The team can handle up to six different transmissions simultaneously on the rigs used in the Caribou, and up to three in the Hueys.

Army Aviation



in Vietnam



Colonel Ben F. Hardaway, USAF

Chief, Advanced Research Projects Agency, Research and Development Field Unit, APO, San Francisco 96243

Searchlight for Helicopters

ONE OF THE greatest challenges encountered by counterinsurgency forces is the necessity to find and destroy guerrillas operating at night. The insurgent uses every cover available to him, and night is his natural environment. Passive defense measures are totally inadequate to meet, let alone defeat, aggressive bands operating with full initiative under cover of darkness.

Parachute-suspended pyrotech-

nic flares, delivered from helicopters, fixed wing aircraft, and mortars, have been the chief source of night illumination in Vietnam. The procedure has been very effective, sometimes by itself causing Viet Cong to break off attack on an outpost. However, it suffers the drawbacks of short burning time, drifting downwind out of the target area, and being a collision hazard to aircraft in the area.

A specific suggestion for a handheld carbon arc searchlight system, powered by a portable generator, to be carried internally in the UH-1B was made by Capt Jack R. Barnhisel, a platoon commander in the 119th Aviation Company. The suggestion was routed through U. S. Army Support Command, Vietnam (now U. S. Army, Vietnam), to the Joint Research and Test Activity of the U. S. Military Assistance Command, in Saigon, and was assigned to JRATA's triservice ARPA Field Unit for action.

Navy Lt Cdr Grady A. Weeks took the basic concept and developed it his own way, using a maximum of on-hand materials. For a light source, he used seven C-123 landing lights. A framework of tubing with pivots (see illustration) holds the lights in a cluster and allows the six on the outside to be converged or diverged at the will of the operator. This motion permits a concentrated spot or a more diffuse floodlighting of the terrain.

The cluster itself is pivoted on a lightweight base which clamps without any modification to the cargo tiedown rings on the deck of the UH-1B. Adaptation of the assembly to other hold-down configurations would be relatively simple. A hand lever permits the light array to be retracted completely into the cabin and to be extended outboard to a horizontal position. The mount also allows the operator to aim the beam through an arc of about 40° longitudinally and about 35° laterally. At normal speeds, pilots have no difficulty in compensating for the slight yaw effect resulting from drag.

Individual circuit breakers (on a small console fastened to the base) allow full selection of the lights to be used, and a master switch gives simultaneous on-off control. The total current required is 135 amperes. Since the UH-1B generator is rated at 300 amperes, with a normal operating load of about 100 amperes, it was possible to connect the lights directly to the main bus. Avoiding the necessity of an auxiliary power unit made the system far more attractive to users, and held the total weight to 90 pounds.

Army Maj William E. Crouch was project officer for test and evaluation. He encountered no unusual vibration or control problems in flight at airspeeds up to 85 knots. In actual night combat use with the 114th Aviation Company, excellent ground illumination was obtained up to 3,500 feet altitude. At higher altitudes a haze layer interfered with the helicopter crew's ability to aim the light at the desired area.

Armed ships flying at lower altitudes outside the cone of light teamed up with the searchlight ship to deliver gun and rocket fire into the illuminated area. They were able to get changes of area on call. Personnel participating were very favorably impressed with the system and felt that a company-sized landing could be made with the beams spread to the floodlight position.

In another combat use, members of the 197th Aviation Company, who were flying the searchlight ship for training, observed a ground fire fight near Thu Dau Mot. Contacting the friendly ground unit, they were requested to use the searchlight to help identify the position of the attacking Viet Cong. The ground advisor reported that the light helped a great deal and was probably a contributing factor in thwarting the VC attack.

Two of these systems have been locally fabricated. United States Army, Vietnam plans to procure enough of them to equip each airmobile company in Vietnam.

This helicopter searchlight system has demonstrated its capability for nighttime route reconnaissance and area search, and adds a new dimension to counterinsurgency at night.

Reminiscences from Vietnam are pieced together to portray some of the ways in which a flight surgeon spends his time there, perhaps in what could be construed as a

Typical Day

Major Anthony A. Bezreh
Chief, Department of Aviation Medicine
U. S. Army Hospital, Fort Rucker, Alabama

"YOU'LL LIKE the doc. We all like him here," said the CO as we picked our way across perforated steel plates that were sinking into the mud path heading from the flight line to the compound. We had just flown in by Otter, or by the grace of God, as the case may be, through a mountain pass that was obscured by an overcast. But the pilots knew by feel where that pass had to be, and they were right. They had a real quiet audience in the cabin though while we were in the process of finding this out. "Why, we'd never accomplish a mission if we turned back every time we ran into a situation like that," was the all too true explanation.

"Yes, you'll like the doc. He was as green as they come when he first got here. You should have seen the way he had on his uniform!

"But, he's a conscientious, hard worker and has picked things up real fast. We couldn't get along without him now. He's right with the program, all the way."

A duck under a tent flap and we were in the aviation dispensary. A gangling doctor in fatigues was leaning over a patient on the examining table. "Have you ever seen a case of dengue?" he asked after some brief introductions. "I think this pilot has dengue, but I can't be sure. The fever, the rash and the abdominal pain all fit the picture; so we're going to airevac him out to the field hospital this morning." The pilot smiled weakly, and I thought a little sheepishly, as if he were getting a vacation that he wasn't quite sure he needed.

With this disposition decided, we became buried in the onslaught of sick call. What seemed like a battalion of athlete's foot, heat rashes, simple diarrheas, runny noses, and muscular aches and strains marched through the little tent in relentless procession, to each of which the "doc" adeptly administered the proper potion.

"Pretty routine stuff usually—this sick call. The hard part comes later when the guys are returning from the mission. Other than that the problems are psychological stress reactions and an occasional case of some communicable disease. There is one of the pilots I'm particularly worried about. He's been in and out of a state of depression for the last couple of weeks. He's developed a bad attitude and I'm afraid it might affect the morale of some of the others."

After inspecting the latrines, we held a meeting to outline a rat control program since some big ones had been seen around the compound. Then came the problem of whether to requisition some gamma globulin. It seems that one of the cooks had just come down with hepatitis and it was feared that an epidemic might break out among the men. "Now we have got to decide whether we should watchfully wait to see if any secondary cases of hepatitis break out or whether we should go ahead with the tedious job of shooting everyone prophylactionally with gamma globulin."

While we were mulling over the pros and cons of this, a call came in from an ARVN company in the area to pick up some wounded men in need of emergency medical care. As we ran out toward the helipad, the UH-1 was already winding up. It was raining heavily and visibility was miserable. The

chopper nearly hovered its way across the top of the jungle, eventually toward the vague glow of a flare.

As it sat down in a clearing, some ARVN troops appeared from the shadows carrying three wounded men toward the chopper. The injured clambered or were barely piled aboard before we whisked away. By the time the blood soaked pressure dressings were changed and the injuries assessed, the air ambulance had found its way to the ARVN hospital. There the patients were absorbed amidst the hurry-scurry of nurses moving like swift white angels in their starched uniforms. We talked for a few moments with the ARVN doctor before leaving. "We hardly have any space to put these men," he said. We left him to his destiny, not to feel sorry for ourselves again for a long, long time.

Evening brought fatigue and boredom to most of us in the compound. After chow we watched a movie, but couldn't really get interested in it. A mission was scheduled for tomorrow, which meant increased tension to many. With little left to do most of the men wandered off to hit the sack.

The doc and I headed toward the club. On the way we met a man dressed in civilian clothes. He had a pistol in his belt and looked as if he had been running a long way. A closer look in the moonlight revealed that he was the individual pointed out to me earlier. Doc asked him to come on into the club with us. We entered the bamboo hut together and all sat down facing each other. Someone lit a dim lamp that just seemed to increase the shadows, and we opened some cans of beer. Sipping the cold brew we stared at each other's silhouettes.

Still obviously wrought up, the aviator suddenly blurted out, "Doc, I can't go on that mission tomorrow . . . I'm tired of being shot at. I just can't take it anymore . . . I'm scared. If I fly tomorrow, I'll get it for sure; I'm jinxed . . ."

Doc let him run on until he quieted down a bit. Then he countered, "You know you'll have to go. You're in the same boat as everyone else. Some of the others are afraid too, but they go just the same. We need every man we've got. Tell you what, I've got to fly tomorrow with someone. It might just as well be you. Why don't we go together? That way I can find out what this jinx is all about."

A few minutes later, the aviator left, seemingly satisfied with the plans for tomorrow's mission. Doc explained to me that this aviator's problems had been compounded by his love for a local girl and his apprehensions about having to leave her. Fatigue, personal problems, and stress of war can sometimes cause the latent fear in each of us to become temporarily predominant.

The next morning, Doc and the aviator showed up at the flight line together, as if nothing had ever happened. All the aviators went out and they all came back. That night Doc went to sleep smiling to himself over a small therapeutic triumph that others would never know about. I think the pilot slept well that night, too, for he had faced his fears and like the ghosts they were, they disappeared.

This article tells how aviation personnel are helping to solve problems with field expedient measures and quick exchange assemblies. Ingenuity and professionalism are evident and unit missions are accomplished faster, safer.

On Site Oil Cooler Swap

Captain Fred R. Michelson

HERE AT Pleiku, like many other installations in Vietnam, we are a small detachment supporting an Airmobile Light Helicopter Company and an additional airlift platoon. One phase of our job deals with aircraft recovery. Being a third echelon agency we work with our direct support agency in recovery of aircraft. However, when company size operations do not necessitate a direct support recovery team to be on hand, we must always be ready to perform the needed first-aid to get our downed bird home again.

Past experience in recovery of downed helicopters in a combat zone can produce quite a stimulus for devising many timesaving quick change assemblies. We of the 545th Transportation Detachment have had quite a few recoveries within the last 60 days, but of these recoveries we can think of two for which we wished we'd done some earlier engineering and planning.

These two dealt with damaged oil coolers. If you are an old UH-1B mechanic or maintenance officer then you probably know the hours and gymnastics it takes to pull and install oil cooler assemblies. If you are not familiar with the system, then take my word for it—it can't be done quickly. Our best time for pulling and installing an oil cooler and fan is something like 2 hours and 45 minutes, and we thought we were doing well. However, as you know, when a bird goes down 2 hours and 45 minutes, it seems more like an agonizing era of unpleasant chance in the Viet Cong infested countryside.

We have in the past devised quick change assemblies on engines, fuel tanks, and tail booms, but

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nothing in the way of changing oil coolers quickly. Thus I hereby convey our new dream come true, a QCA oil cooling system.

This new 15-minute installation is made up of the following parts:

Engine and cooler components

1 ea	Engine oil cooler assy	FSN 1560-737-6605
2 ea	Oil fittings	FSN 1560-898-0007
1 ea	Tee fitting	FSN 4730-278-2779
1 ea	Elbow fitting	FSN 4730-277-2459
1 ea	Tube reducer fitting	FSN 4730-805-5100
1 ea	Coupler reducer elbow	FSN 4730-886-1400
1 ea	Hose assy	FSN 4720-738-8284
1 ea	Hose assy	PN 60100-12D-1254
1 ea	Coupling, half quick disconnect	FSN 4730-684-7150

Transmission cooler bypass

1 ea	Hose assy	FSN 4720-758-0172
1 ea	Nipple tube	FSN 4730-684-6914
2 ea	Coupling half quick disconnect	FSN 4730-773-2621

The top heater compartment door located on the right side of the aircraft was manufactured out of .063 sheet aluminum with an extra layer of .063 aluminum riveted to the inside for reinforcement where the cooler is bolted to the door. We also manufactured two braces which run from the outside of the cooler to two bolts around the fuel cap. This also adds stability to the mounting.

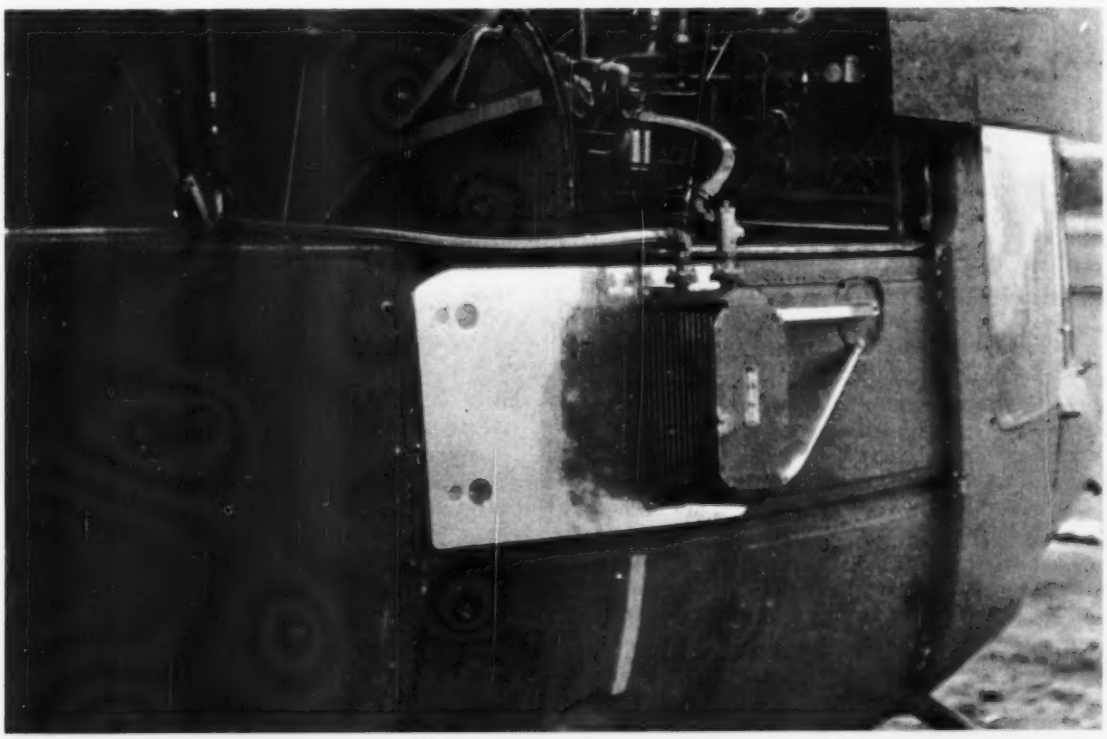
Proper procedures for installation of this QCA follow:

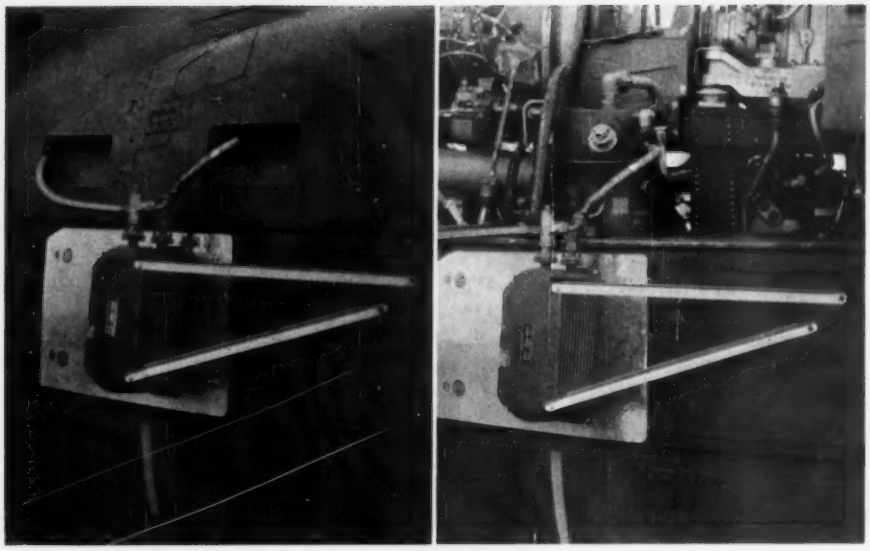
- Open transmission coupling and remove oil hose from transmission sump to work deck on left side and cap male quick disconnect.
- Position oil hose FSN 4720-758-0172 on sump outlet connection and route around front of transmission sump.
- Remove female quick disconnect half from main transmission oil filter inlet hose to sump outlet hose with hose nipple FSN 4730-684-6914.
- Cap quick disconnect with female quick disconnect half which has had inside release pin removed and hose connection capped to keep out dirt.

Proper procedures for installation of engine cooler assembly are as follows:

- Close right engine and transmission coupling and replace upper heater compartment door with new cooler mounted aluminum door.

QCA oil cooler on Huey that's ready for return to base maintenance





Far right: Quick change assembly shown with Huey top heater compartment door removed. Right: Installation with heater compartment door closed.

• Open left engine coupling and remove hose from engine oil pump to work deck.

• Cap quick disconnect with female quick disconnect which has had inside release pin removed and cap fitted to hose connection to keep dirt out.

• Position hose PN 60100-12D-1254 from oil cooler inlet to engine oil pump outlet through right engine coupling fire extinguisher door.

• Position hose FSN 4720-738-8284 from cooler outlet to engine oil tank inlet through transmission fire extinguisher access hole and then cap oil tank inlet tubing to keep out dirt.

• Tighten all parts, fittings, and braces and run up aircraft to check for leaks, instrument readings and stability of mount.

Data obtained during this test flight were:

Outside air 24° C.

Engine oil temperature after start 43°.

Engine oil pressure 75 psi.

Transmission oil temperature 53° and slowly climbing.

Transmission oil pressure 67 psi.

All other instruments were reading normal.

Aircraft was then hovered for 5 minutes and checked again for leaks and instrument readings:

Engine oil temperature 60° and rising slowly.

Engine oil pressure 70 psi.

Transmission oil temperature 68° and rising slowly.

Transmission oil pressure 60 psi.

All other instruments were reading normal and well within limits.

Our test flight covered a period of 45 minutes. During this time we made three normal takeoffs and landings. The remaining 30 minutes was spent at normal cruise power setting. Our altitude indicated 4,000 feet and an outside air temperature of 20° C. The following readings were obtained throughout the flight:

50° engine oil temperature.

70 psi oil pressure.

60 psi oil pressure.

78° transmission oil temperature.

All other readings were normal and well within limits.

Aircraft was then returned to the airfield and hovered to parking without change of readings.

After shutdown the battery switch and inverters were left in the on position for 10 minutes to obtain the following readings:

Engine oil temperature rose to 68° then started slowly cooling.

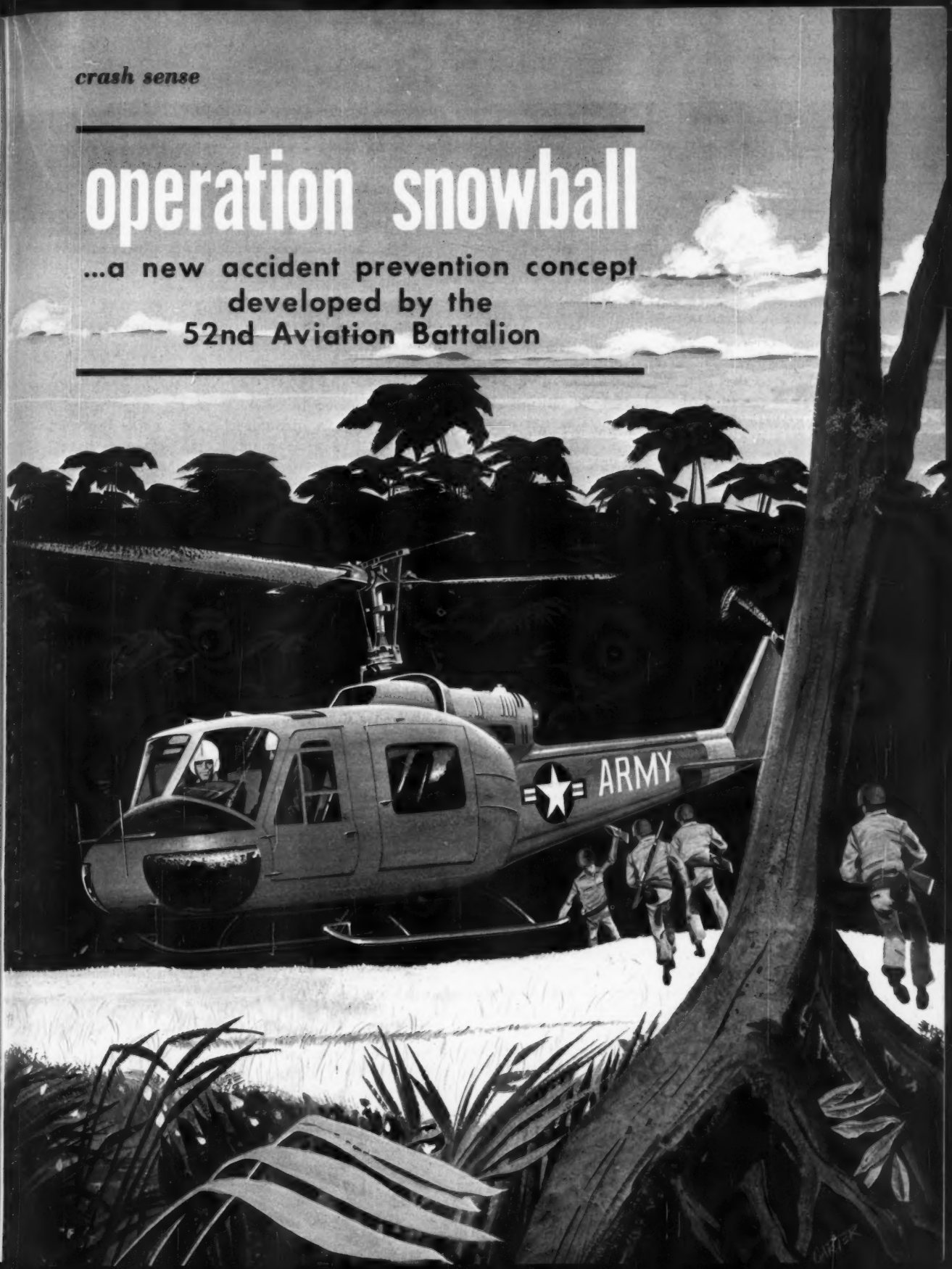
Transmission oil steadily cooled.

All other readings were normal.

In summary the entire flight was made without a transmission oil cooler, and the engine oil ran cooler than normal mounted outside the aircraft. We feel that the contribution and effort of unit mechanics for gathering and constructing this oil cooler QCA was a major boost to efficient future recoveries. If we never have to recover another aircraft with a shot up oil cooler, we can at least breathe easier knowing we can perform this otherwise time-consuming chore quickly.

operation snowball

...a new accident prevention concept developed by the 52nd Aviation Battalion



EFFECTIVE AIRCRAFT accident prevention starts at the top. Nowhere is this better illustrated than with the SNOWBALL program recently started by the 52nd Aviation Battalion. Following is a letter the battalion commander dispatched to all battalion unit commanders 1 September 1965:

"During the past 30 days this battalion has experienced an unacceptably high aircraft accident rate. Through various circumstances we, or attached units, have totaled four helicopters and one O-1F. One aviator has died, three have been seriously injured, and several other crewmembers have received minor injuries.

"In conference with most unit commanders, safety and maintenance officers, I have attempted to isolate one or more common factors that may account for these accidents, particularly the problem of engine failures. Thus far, no common factor can be determined. Therefore, I propose to institute certain actions designed to:

• Reemphasize the fundamentals of safe aircraft maintenance and operation.

• Reevaluate our operational procedures to ensure that mission accomplishment does not lead us into overtaxing men and machines beyond safe tolerances.

"Effective upon receipt of this letter, each unit commander will institute within his organization the SNOWBALL concept of daily working accident prevention procedures. Fundamentally, SNOWBALL is designed to create in the minds of every aviator, crewchief, and mechanic, as well as operations personnel, air traffic controllers, POL and munitions handlers, and supervisors, the need for that extra daily effort necessary to eliminate conditions which contribute to accidents.

"At its inception, each unit will set as its goal an accident free record for the following day. This daily approach will be continued until a week without accidents has been achieved. The unit will then set its goal for a second accident free week. By this means, the days will SNOWBALL into a month without accident in the battalion. We will then snowball the months until we have set a safety record for all to admire. Specifics of SNOWBALL include:

• Examination and adjustment, as required, of all engines so that the N1 turbine speed is within limits set by the green run sheet. This will be accomplished by the field maintenance unit with assistance of the Lycoming technical representative.

• A positive and daily reemphasis of safe practices, checks, inspections and training.

• A programmed, controlled and thoroughly supervised program of inspections of airfield and stagefield facilities with particular emphasis on air traffic control, parking procedures, and POL quality controls.

• Installation of signs reading SNOWBALL in all offices, briefing rooms, messes, latrines, clubs, and living quarters. These signs need not be fancy, merely legible.

• Positive and close supervision by commanders of training given to newly arrived aviators to ensure a more than adequate checkout. Close control by experienced aviators until new personnel have thoroughly mastered the demanding flight techniques required by operations in this area.

• A continuous search for unsafe conditions or practices. When detected, appropriate action will be taken to correct such conditions and an informal report will be made to this headquarters (ATTN: Safety Officer) so that other units may profit. Conditions which cannot be corrected at local level will be reported to this headquarters so that assistance may be provided.

• Close monitoring of pilot time. An aviator reaching 90 hours of flying time in any one month will be grounded until examined by a flight surgeon who may release him for up to 110 hours per month. This program must be carefully administered, however, since conditions and types of operations vary greatly among units, and tolerances among individual aviators likewise vary. Platoon commanders must be particularly alert to the physical limitations of all pilots. It is far better to ground an aircraft than to destroy it and its crew.

"In summary, I reemphasize that SNOWBALL is not a gimmick. It is a positive, progressive program, dedicated to creating a daily mental attitude that will cause crewchiefs and mechanics to devote extra effort to find and correct the minor deficiencies that cause accidents—that will cause aircraft commanders and pilots to make more careful preflights, to keep a closer check on their instruments in flight, and to ensure their operating the aircraft within mechanical tolerances—that

will cause tower operators to tighten up their actions for safer flight within the vicinity of our airfields—that will cause POL handlers to be more alert to the problems of contamination of the products they handle.

"I do not propose to take refuge behind such factors as the high density altitudes we operate in or long periods in which we have operated in the field away from home base as excuses for accidents. I believe that with the extra alertness, the extra effort and respect for the limitations of our aircraft which SNOWBALL embodies, we can solve this accident problem."

As an addition to his letter, the CO included the following SNOWBALL notes:

"UH-1 Engines

—Clean inlet screens, inlet guide vanes and first stage compressor blades weekly instead of only at PE.

—Install engine inlet and tailpipe covers if the aircraft is not to be used immediately. (TB Avn 24-9)

—During engine shutdown, allow two minutes at flight idle for cooling.

—Change rotor head and engine oil when it becomes dirty, not at specified intervals. If it becomes dirty after 5 hours operation, change it.

—Keep a constant check for fuel contamination at prestock points. Keep a good lookout during preflight as well.

—Keep a continuous check on pilot recorded EGTs. Compare daily readings for trends pointing to failure.

—Leave the engine within green sheet recordings. Turning the wick up by as little as 1 percent will decrease life of some of the engine parts by 50 percent.

—While cruising or moving normal loads, keep the engine rpm down to 6600. Use the maximum available speed only when required.

—Check the intakes frequently for foreign objects that the mechanics may have dropped while making repairs. Report any foreign objects that are found.

—Pay close attention to fuel quick disconnect fittings. A partial retraction of the prongs will result in fuel starvation when a heavy demand is placed on the fuel system. The engine can run for hours with the prongs partially retracted if a heavy demand for fuel is not present.

"Weight and Balance

—Keep weight and balance data current. If weight and balance teams are required, request them.

"UH-1 Flight Control Systems

—A closer inspection of the tail rotor system is necessary. Worn pitch change links and cracks cannot be observed unless you get up with it.

—Clean or wipe the servos daily.

—Increase pilot preflight emphasis, especially as the aircraft grow older. Look for cracks, leaks, proper safety procedures, and security of fittings.

"UH-1 Airframes

—Go slow on violent turns, especially pedal turns. Perform them only when the tactical situation requires such action.

—Keep a close check on the FM antenna mount. A weakened structure will allow the mount to flex into the tail rotor.

—Inspect the cargo door fittings for condition of the rollers and tracks. Lubricate as required.

—When the cargo doors are open, secure them with the lock and pin.

—Stay within the load and c.g. limitations.

"Administration

—Increase supervision of crewchiefs as well as service platoon mechanics.

—Running PEs will not be used within the battalion.

—Use published instructions for maintenance and operations.

"Marginal VFR Flight Conditions

—Incidents have been cited recently where aviators of this command who are not rotary wing instrument qualified have entered actual instrument flight conditions in rotary wing aircraft. In most instances the circumstances indicated that no necessity existed for entering AI conditions. This practice endangers the lives of individual aviators and passengers and constitutes a flight hazard to legitimate IFR traffic. Therefore, members of this command will not deliberately engage in this type of flying.

—The weather minimums prescribed by the 52nd Aviation Battalion will be adhered to by all aviators of this command. Due to the limited number of weather forecasting facilities and secure landing areas it may be necessary to make 180° turns quite frequently. These 180s will be executed *prior* to

encountering instrument conditions. Flight commanders leading helicopter formations will not deliberately 'feel out' marginal weather conditions in an attempt to reach their destination. If the mission cannot be conducted under VFR conditions it will be aborted."

A monthly aircraft accident prevention council meeting was held by the battalion 4 September 1965. This meeting was attended by the battalion commander, executive officer, S-1, S-3, aviation safety officer, maintenance officer, flight surgeon, and standardization officer. In addition, five company commanders, two platoon commanders, four company and platoon safety officers, an operations officer, and two other company and platoon representatives were present. The battalion aviation safety officer recorded the following items from this meeting:

"Copies of the 52nd Aviation Battalion Aircraft Accident Prevention Program were passed out. It was explained that this program has now been adopted by USABAAR as the recommended standard aircraft accident prevention program of the Army [see "Aviation Safety Planning Guide," page 36, U. S. ARMY AVIATION DIGEST, September 1965]. The contents of the program and their application by the units were discussed. The battalion commander stated that a concerted effort by the units would be made to implement the program.

"The newly instituted concept of daily aircraft accident prevention SNOWBALL was discussed. All unit commanders and safety officers were asked to give the program their full support to get it going. Accidents can be eliminated. Let's work to snowball the accident free days into an enviable record.

"The battalion policy on mixing IFR flying with VFR was emphasized. The battalion commander stated that aviators would not indulge in IFR flying unless fully qualified and authorized to do so. When flying on VFR flight plans, a 180° turn will be made prior to encountering IFR conditions.

"Unit safety officers were asked to survey all helipads and fields within their respective areas of operation to eliminate safety hazards. Information concerning hazards which warrant notification of all other pilots using the field should be passed to the battalion aviation safety officer.

"In the past month, two UH-1 helicopters parked near active runways received major damage when struck by fixed wing aircraft. Neither of the helicopters was assigned to the 52nd Aviation Battalion. However, it was pointed out that the battalion is not immune to this type of accident. An accident investigation folder and picture of an incident involving extensive damage to two UH-1Bs assigned to the battalion were shown.

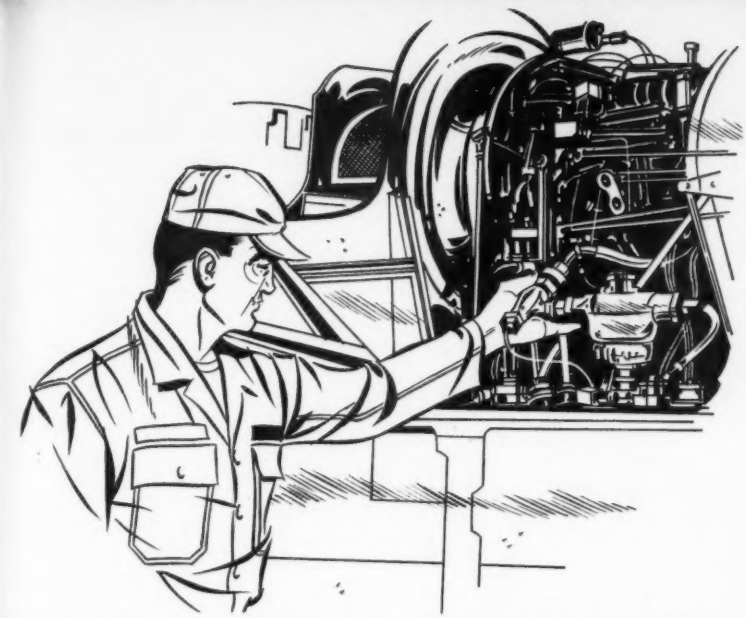
"The damage resulted from a C-47 striking the parked choppers. The occurrence of similar incidents has been averted by alertness of the mission and stagefield commander to parking hazards. Commanders and safety officers were asked to continue to exercise caution when operating out of stagefields. Also, all members were reminded of the hazards involved when fixed wing aircraft attempt to land or take off near helicopters operating near the runway.

"The battalion commander pointed out the necessity for each individual aviator to be ready to go, day or night, on short notice. Each aviator has a responsibility for the mutual security and defense of his unit. He must be able to discharge these responsibilities at all times. To overindulge in alcoholic beverages jeopardizes the security of all.

"The subject of accident reports was discussed. The following points were brought out:

—Aircraft accident reports are coming in late from the boards. The most common cause of late reports has been the necessity to use aviators engaged in aircraft accident investigation for tactical operations. This often disrupts board proceedings

Clean inlet screens, inlet guide vans and first stage compressor blades weekly



Pay close attention to fuel quick disconnect fittings

and makes it very difficult to assemble the board members. Commanders were asked to give consideration to the timely completion of accident reports.

—It was recommended that 12th Aviation Group coordinate with the 8th Field Hospital to arrange for initial treatment of aircraft crewmembers involved in aircraft accidents. This would assist flight surgeons on accident investigation boards in completing their reports, especially in cases where the patient is immediately evacuated from the accident scene prior to being treated or interviewed by a flight surgeon.

"Some of the common errors found in crash facts messages were discussed:

—The message should state who was actually at the controls of the aircraft.

—The 52nd Battalion should be included as an addressee.

"Units were reminded that the crash facts message is due out in 8 hours. A supplemental crash facts will be sent when complete information is not available for the initial message. A dollar estimate will be included in all incident messages.

"An aircraft accident report of a mid-air collision was reviewed to impress upon the members of the council the necessity for continuous monitoring of unit formation flying.

"Helicopters will maintain at least the distance of two rotor discs at all times. Formation flights will not be made over the field during periods of heavy air traffic and at no time without prior approval of the control tower.

"Safety officers were asked to check the status of hydro kits within their units. Each aircraft should carry a kit for the detection of fuel contamination. The kit can be used for JP-4 or 115/145 fuels. The POL section has extra kits for issue.

"A supply of go-no-go cards has been received from Bell Helicopter Company and is available for issue by the maintenance officer. These cards are the best means available to an aviator for the rapid calculation of adequate takeoff power under heavy load conditions. Aircraft continue to be seen in all units without the cards installed. Commanders and safety officers were asked to see that the cards are installed.

"It is considered poor technique to use the pitch control in the UH-1 helicopter for slowing the rotor blade during shutting down. Invariably mast bumping will be induced as the rotor blade climbs into the wind. In addition, the turbine engine is not allowed adequate time for cooling.

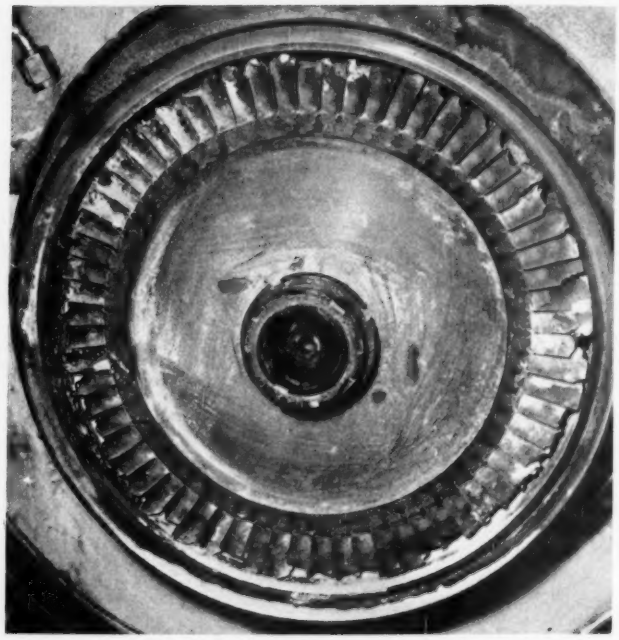
"The battalion maintenance officer reemphasized the need for letting the engine run in flight idle for two minutes before cutting the main fuel off.

"The battalion maintenance officer discussed maintenance aspects of the SNOWBALL program. Exhaustive efforts have been made to obtain a weight and balance team to weigh a representative portion of all type aircraft within the battalion.

"The battalion commander summarized the meeting by reiterating that each commander must analyze the problems inherent to his unit's operation. No attempt will be made to gloss over the facts or take refuge behind such factors as the high density altitudes we operate in, or the long periods in which we have operated in the field away from home base as excuses for accidents. By adhering to basic fundamentals, the accident problem can be whipped."

crash sense

CHOPPER TIPS from VIETNAM



Turbine blade failure can result from shutting engine down without allowing EGT to stabilize

• Many UH-1 pilots are not allowing the EGT to stabilize before shutting down the engine. This results in excessively rapid cooling of the engine which may cause cracked exhaust deflectors. In addition, over an extended period of time, it can result in N1 and N2 turbine blade failure, reducing engine reliability and life.

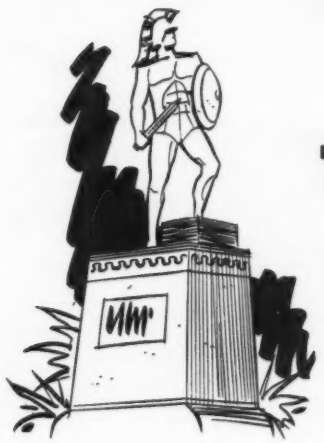
• A recent OH-13S engine failure which resulted in a forced landing was caused by a dirty air induction filter. The tech rep recommended this filter be inspected and cleaned daily by tapping. When operating the aircraft in heavy dust conditions, the filter should be changed every 25 hours. In moderate dust conditions, it should be replaced every 50 hours. The filter should also be changed any time a decrease in normal operating manifold pressure is noted.

• A mid-air collision was narrowly averted during a troop lift when an armed UH-1B escort flew toward the flight of troop helicopters which were landing in trail. The second from the last troop helicopter was in a steep approach to short final when the escort flew underneath. The pilot of the last helicopter transmitted a warning and the descending troop helicopter made a go-around to avoid descending into the rotors of the armed escort.

• A UH-1D engine lost power during a maintenance test flight and the pilot autorotated to an airstrip. Loss of power was caused by an improperly connected main fuel quick disconnect coupling. The quick disconnect coupling was tight, but the pins were not locked and the fuel line vibrated off after 23 minutes of flight. Recommend all pilots check security of coupling and *check for extended prongs* during every preflight.

• A CH-37 lost power from no. 1 engine after takeoff and struck wires, causing major damage. Twenty spark plugs were found with partial insulation breakdown and one plug had been cross threaded, allowing gas leakage.

• After flying for 25 minutes at reduced torque to keep the engine temperature within limits, a UH-1 pilot noted decreasing rpm and autorotated. Excessively high EGT burned away N1 turbine blades. High EGT was caused by hot air leakage from compressor to no. 1 bearing due to worn front shaft.



TALES FROM THE TROJAN

Following are three articles in keeping with the Vietnam theme of this issue. They were written by three graduates of Class 66-1, Army Aviation Safety Course, Aerospace Safety Division, University of Southern California. The authors recently returned from Vietnam.

All Out Effort

I took an incoming call from an Army air liaison officer assigned to a Military Assistant Advisory Group early one evening. He told me that a U-1A was overdue on a return flight from Nha Trang. The aircraft had left Nha Trang for Ban Me Thuot at 1250 hours on a VFR flight plan. On board were a crew of three and five passengers.

Telephone checks with Nha Trang and other airfields in the area failed to locate the aircraft. Radio checks with special forces camps in the area also proved negative.

Nha Trang, located on the coast of the South China Sea, was in the middle of its rainy season. The weather was 3,000 feet overcast, visibility 4-6 miles, with cloud tops about 8,500 feet. Weather in the mountains was unknown. Ban Me Thuot on the central plains, west of the mountains, was in its dry season. It had been clear around Ban Me Thuot all day, typical weather for that time of year.

It was 1830 hours and the liaison officer was certain that the aircraft was down. Darkness would soon set in. It was necessary to get things moving fast. He started a search of the local area around Ban Me Thuot with the aircraft available to him, in hopes of either spotting the aircraft or making radio contact with it. It was well after dark when the last search plane returned and no contact had been made with the downed aircraft. The necessary coordination had been completed, and it was now necessary to initiate a major search and rescue operation.

Overall responsibility for search and rescue operations in Vietnam is with the U. S. Air Force, 2d Air Division. They now took over the coordination of the search and rescue operation. Ban Me Thuot was designated as the operation center. The Air Force officer at Ban Me Thuot was detailed as the coordinating officer and developed a plan for the search. He divided the area between Nha Trang and Ban Me Thuot that covered the possible flight paths into rectangular areas on a map and designated them by code numbers. He requested and got all available Army aircraft in the area for the search. The search aircraft at Nha Trang were assigned areas that night and would be airborne the next day as soon as weather permitted. The other aircraft would report to Ban Me Thuot.

Early the next morning, the commanding officer of an Army Aviation battalion arrived at Ban Me Thuot with eight UH-1Bs. While the aircraft were being refueled, the pilots were briefed on the mission and assigned areas to search. All aircraft were airborne and heading for their areas within an hour.

Some of the areas near Ban Me Thuot were flat and had been cleared for planting. Other areas were hilly and covered with trees or high grass. About half of the search area was in mountainous

Tales From The Trojan

All aircraft were airborne and heading for their areas within an hour

terrain covered by a dense forest canopy. One of these mountains rose to an elevation of 7,900 feet, the highest in the area. As the pilots flew over these areas, they thought about what it must be like to crash in the wilderness below and they began to feel the urgency of their mission.

Late that morning, the aircraft was sighted on the southeast slope near the peak of the 7,900 foot mountain. A crewmember of one of the helicopters saw the reflection of the sun on the wings of the downed aircraft. This was a tremendous break for the searching aircraft. That afternoon, with the sun on the west slope of the mountain, it was impossible to see the Otter. Its olive drab color blended perfectly with the color tones of the mountain.

After locating the aircraft, numerous low passes were made past it in hopes of spotting some sign of survivors. It was impossible to get near the site because of gusty winds around the steep mountain slope. The wind and the dense forest coverage prevented sighting possible survivors or determining the condition of the plane.

When the commanding officer of the aviation battalion returned from the crash site, plans were made for the rescue operation. Three plans were proposed. One was to make an assault landing on the side of the mountain. From there, the rescue party with its security force could work its way up to the crash site. The only suitable landing zone was at an elevation of about 3,000 feet. This would require the rescue party to climb 5,000 feet up the side of the steep mountain to get to the crash site.

The second plan was to land on top of the mountain. There was a level area about 40 feet long and 30 feet wide at the very peak that looked suitable for a possible landing pad. It was covered with tall grass and it was impossible to tell if it was rocky or flat. A pinnacle approach to a small pad, 8,000 feet high in a strong gusty wind, is not considered a helicopter pilot's delight. A paradrop was also suggested.

A decision was soon reached. Two UH-1Bs would attempt the pinnacle approach and rappel four special forces personnel onto the mountaintop. If this worked, we would attempt to place the remainder of the rescue party on the mountain pad. Two of the UH-1Bs were readied for the rappelling operation. I was in the second aircraft. As we departed for the mountain, the remainder of the UH-1Bs started moving the rescue party and necessary equipment to a staging area at an airfield located near the base of the mountain.

Before attempting an approach to the mountain pad, we climbed to 8,000 feet and checked our ship to see if we had enough power to hover out of

ground effect. We had power to spare and the rescue team was soon on the mountain peak. In a short time, they had a small helipad prepared and the remainder of the rescue party was brought in.

It was now late in the afternoon. The last of the security force had been placed on the mountain and the rescue team had started working its way down to the aircraft. It took them more than an hour to descend to the crash site. Everyone was waiting for that first report from the rescue team. It came—there were no survivors. The operation continued until dark and was finally completed the next day.

There is one lasting impression that this entire mission left with everyone involved—the willingness and all out effort by all aviation personnel to work together to find and rescue fellow pilots when they go down.

Night Fright

It was the night of Ho Chi Minh's birthday, 1964. I was leading a volunteer flight of three armed UH-1B helicopters on a night reconnaissance mission. Our reinforced fire team was to attempt to locate large Viet Cong troop movements within a radius of 7 miles from our base at Soc Trang.

Intelligence reports stated that the VC planned to overrun Soc Trang and attack the Americans based at this isolated Mekong Delta outpost. We planned to attempt early detection and dispersion of the guerrilla force with our armed helicopters.

Each volunteer crewmember knew that the risks would be great. The Viet Cong would both hear and see us first, so they would also shoot first. Over 500 VC had recently infiltrated the area, reportedly with heavy caliber machineguns. In addition, none

of our aviators were familiar with the local area. Finally, the night sky was overcast, so neither natural light nor a visual horizon would aid us.

At 2300 hours, we pulled pitch. This type of mission had never before been attempted, so only imagination limited the tactics used. I elected to use each of our helicopters in a slightly different role to counter the obstacles we faced.

I flew the lead aircraft low enough that, by traversing my searchlight, I could visually scan the terrain to my immediate front and 45° to each side. The other choppers were blacked out, except for dim instrument lights. With only one constantly moving light visible, the Viet Cong could not aim with ease at me. With only the beating rotor blades of my two fellow snoopers, they appeared safe.

My wingman, the number two ship in the flight, lurked in the blackness several hundred meters to my rear, slightly above and to the left of me. He was to engage and attempt to neutralize any fire I received from the front or flank. I counted on the shock created by his rocket and machinegun fire coming from total blackness to allow me time to douse my own lights and climb to an attack altitude.

The third UH-1B in our flight was armed with rockets and machineguns. It had the dual role of providing backup firepower and remaining at sufficient altitude to appear on the monitoring radar.

For 15 minutes all eyes strained into the narrow world created by the eerie traversing of the searchlight, left and right. Tension mounted. My left thumb was growing numb from moving the searchlight beam, and I considered trading positions with my wingman. The concentration was becoming unbearable. Suddenly, as my weary thumb moved the beam for what seemed the millionth time, I saw it.

"Break left!" I radioed frantically to my blacked out wingman. I was radically banking my own chopper and increasing power.

At an airspeed of 80 knots, an altitude of 100 feet, in the middle of a rice paddy in the heart of the Mekong Delta, over 90 miles from the nearest known station, I had come within a fraction of a second of crashing into an unlighted radio tower. It was 200 feet tall.

The mission had been well planned, tactically. Large scale maps had shown no obstructions. Every known hazard had been assessed, yet two crews escaped near death only because of a nudge from a tired thumb.

I left Vietnam 10 months later after 1,400 armed helicopter missions. My Huey had sustained 30 bullet holes. I had faced machineguns and known the unique fear felt only when bullets rip through your cockpit and escape is impossible. But, for me, the closest call of all was the night I was "attacked" by that lean, tall tower near Soc Trang.

"Break left!" I radioed frantically to my blacked out wingman

Air Cavalry Qualification

Why should helicopter pilots be extensively trained today in formation flying? The answer is that more and more helicopters are being used to haul troops into combat.

We have the best machines and the best pilots, but sometimes the men lack training. Perhaps they know how to fly as a single ship, or maybe they are fixed wing aviators and only have a few hours in helicopters. And now they have been assigned to an assault division where all they will fly is helicopters.

These pilots are good for flying from point A to point B, or maybe to carry someone to inspect the ranges. Where have we failed the new pilot? Let's look at his last unit. When he arrived, he was introduced to his new commanding officer, turned his flight records over to operations, and was assigned an IP to check him out in the type aircraft the unit has. He and the IP will usually go over a good preflight, then a local area checkout, and a few autorotations. They land and the IP signs the pilot off. Now he is on his own.

I was fortunate to be assigned to Troop C, 17th Cavalry, 11th Air Assault Division at Fort Benning, Ga., a squadron that knows how to train formation pilots to help win the war with their helicopters. Their system, named Air Cavalry Qualification, has worked great in the past and will be even better in the future, as each unit adds to and improves the basic plan.

A new aviator comes into one of the squadron's troops in much the same way as he does in any unit. He meets his commanding officer, gives his flight records to operations, and is assigned to a platoon. After the new aviator has been assigned to a platoon, one of the platoon instructor pilots takes him to the flight line and goes through a preflight much in the same way they did in his last unit. A local checkride, a few autorotations, and the pilot is cleared to go solo.

This is where the similarity between his past unit qualification and cavalry qualification ends. The pilot then goes solo for at least 5 hours to learn to handle and become familiar with the helicopter. After he has ridden again with his IP and has been found safe, he then starts flying as a team—a team consisting of two helicopters. The instructor pilot flies with the new pilot until he can fly a fairly good team formation.

More practice and the new pilot is ready to be trained as part of a section. The same type training goes on for a section as did a team, but now he will be flying with three helicopters instead of one. As a section, they will participate in formation landing and takeoffs. As soon as the section leader is satisfied that the new team member is throughly trained in day formation flying, night training starts.

Night training and formation flying will only be undertaken with appropriate pathfinder equipment and aircraft lighting. All the work we have done with our new pilot during his daytime checkout will not be enough to let him go solo at night.

Sometimes, in marginal weather or at night, a tight formation is the only way you can get from one place to another. Before we teach the new pilot to run, we must teach him to walk. This is done by making good use of our platoon instructor pilot again. Under close supervision of the IP, we start by letting him make approaches to a lighted T set up by a pathfinder. A minimum of three approaches should be made to the T. If it takes more, then by all means let him make approaches until the instructor pilot is sure he is safe. Next, we turn the T lights off and turn the glide slope on. The same process takes place to the glide slope.

After the instructor pilot is satisfied with the new man's approaches, he and his instructor pilot join up with the section they have been flying with in the daytime and they fly night formation. This usually consists of a night cross-country of about an hour. This lets the pilot see the difference in day and night formation flying. Next, they practice formation takeoffs and landings. Only after he has satisfied his instructor pilot with each phase of his flying is he considered cavalry qualified.

accident briefs

STEEP SPIRAL APPROACH

With a load of approximately 750 pounds and five occupants, a UH-1B was flown on a resupply mission to a field site. Radio contact with the ground was made when the aircraft arrived over the site and the aircraft commander was advised to make a downwind approach because of obstacles.

Aircraft commander: ". . . I started my approach from 3,000 feet, setting up a 1,500 fpm rate of descent with the governor decreased slightly. At this time I was setting up a spiral approach to the area. As I started my turn onto final at about 300 feet, I noticed that the needles had split, the rotor rpm was increasing, and the engine rpm was decreasing. During this time I had increased the governor all the way up. As I saw the rotor rpm increasing, I slowly pulled in some pitch to keep the rotor from overspeeding. At the same time I noticed that the gas producer was at 60 percent. As I pulled in pitch, the gas producer did not increase the slightest amount.

"I immediately rechecked the throttle to see if it was all the way to the ON position and at the same time I again increased the governor. About this time, I had about 40 knots and about 75-100 feet altitude. I then started to roll off throttle and threw the governor into emergency. While I was doing this, the rotor rpm was in the green and I was at about 20 feet altitude. At approximately 5-10 feet,

I pulled in all the pitch I had. We hit hard and the aircraft turned 180° to the left and rolled over on its left side. . . ."

The pilot: ". . . We were at 3,000 feet when the LZ was spotted. At that time, we started a descending right turn at 1,500 fpm. At approximately 75-100 feet, rotor rpm started building rapidly as a modified flare was started. At this time we had 60 percent and approximately 40 knot airspeed. The commander stated that we had *governor failure* and went to emergency. By this time we were very close to the ground, about 6200 rpm, and the commander pulled pitch just before touchdown . . ."

The aircraft was destroyed and the crewchief sustained a crushed foot. All other occupants escaped injury.

The governor and fuel control unit were checked on a test stand and found to operate properly.

With the needles split and high rotor rpm, the aircraft commander expected to get an immediate increase in gas producer rpm with collective pitch application. Since he did not, he assumed the governor had failed.

The instrument readings and engine reactions noted by the aircraft commander and pilot did not support the governor failure conclusion. This was confirmed by a Lycoming tech rep who stated that a gas producer indication of 60-63 percent was normal when the needles split. He pointed out that several conditions had to be met before the gas producer would show an increase:

- Application of enough pitch to join the needles.
- A demand placed on the engine.
- The conditions in 1 and 2 must be maintained for at least three seconds.

Since the pilot did not join the needles, he could not have seen an increase in the gas producer. Experienced instructor pilots agreed with the Lycoming tech rep and when the accident investigation board duplicated the conditions of the flight, the aircraft responded just as the tech rep and instructor pilots stated it would.

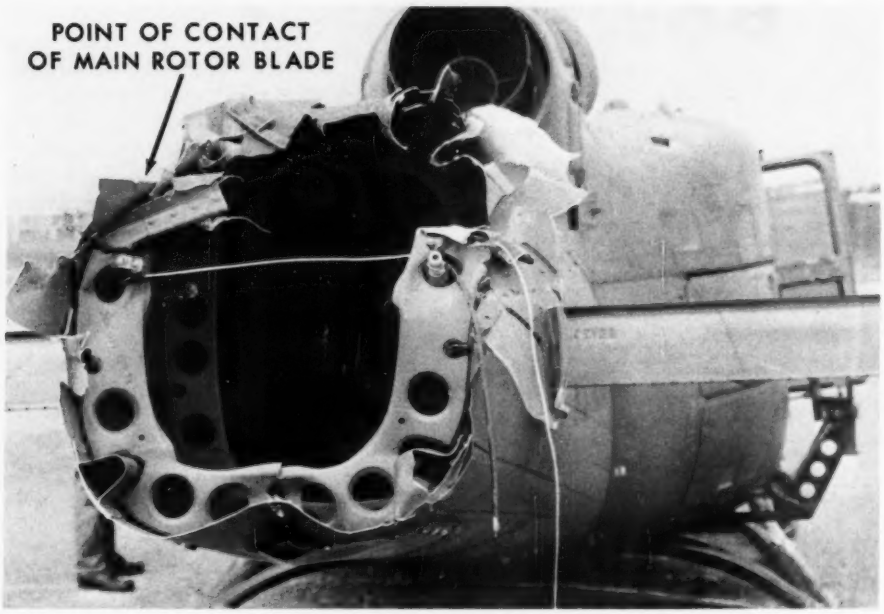
The accident investigation board concluded that the needles split because the rotor rpm increased above normal range during the steep spiral approach. When the needles split, the aircraft commander mistakenly thought he had governor failure. At low altitude, he rolled the throttle off, switched to emergency, and added throttle, attempting to terminate the approach with power. There was not enough altitude and time for the engine to respond. The reviewing official recommended that training and standardization include steep spiral approaches with recognition of normal instrument readings should the aircraft enter autorotation with the throttle full open, and consideration for the lag in engine response after the needles are rejoined.

EXCESSIVE RATE OF DESCENT

It was a combination test and proficiency training flight in a UH-1B, with an instructor pilot, pilot, and crewchief aboard.

The pilot: "After the test flight, we called for winds and found they were 40°-110°, variable, 10 knots. The IP demonstrated a straight in autorotation and then I shot two of them. After the third

accident briefs



autorotation, the IP took it and said he would demonstrate a 180° autoration. We took off from the east end of 04 and he said, 'We'll see how much altitude I lose in the turn.' He also said that he would get the first part of his turn over in a hurry and probably pull some pitch in the turn.

"After takeoff, we broke right and stayed close to the runway. Approximately 100 meters past our intended point of touchdown, he entered autorotation and immediately started into the turn. He had spoken earlier of the importance of keeping the ball centered in the turn, so I watched the ball.

"We came out of the turn at about 250 feet and were in a slightly nose low attitude. I thought we were closing too fast. The IP flared and pulled pitch. We hit tail low and the aircraft moved forward and spun to the right. It started to tip over, but the IP stopped it with opposite cyclic and pitch. After we stopped, I leaned out and looked back and saw our tail rotor and part of the tail boom on the ground.

"The only important things that I could think of were the unusually high rate of descent coming out of the turn and the fact that the flare did not appreciably slow the rate of descent as it usually does."

In its analysis, the aircraft accident investigation board stated: "It was established that the downwind leg was closer to the runway than normal. The IP intended to make a steeper than normal 180° turn, enabling him to be lined up with the runway when he completed his turn to final. The effect of the steep bank in the turn would be to increase rotor rpm. So that rotor rpm would not exceed the limits, the IP added some collective pitch while in the turn. After rolling out of the turn, he dropped the nose lower and bottomed collective pitch. The result of these two actions was an excessive rate of descent."

The board recommended that UH-1 aviators be reoriented about the flight circumstances of the helicopter during autorotative descents and turns, with particular emphasis on the increased rate of descent when the nose of the aircraft is lowered below normal autorotative attitude. The reviewing official added a recommendation that power should be applied immediately for a go-around when the aircraft nears an excessive rate of descent during practice autorotations.

DOWNWIND APPROACH

A CV-2B with an aircraft commander, pilot, crewchief, and 24 passengers aboard approached a 1,600 foot sod strip for landing.

The aircraft commander: "From the air, the surface appeared fairly dry, with the exception of one small area at the southeast end, which appeared muddy. The windsock indicated the wind was out of the northeast, 90° from the strip heading, and varying from side to side. It appeared to be 8-10 knots. I elected to land to the northwest since it was uphill and I elected to use a left hand pattern so I would have better visibility.

"We entered downwind and completed the prelanding check. I throttled back to about 19″ and when the aircraft slowed to 110 knots, I dropped the gear opposite my touchdown point. From this point, I made a STOL approach.

"We ran into light rain on base and it continued halfway down final. The approach was steep and I used a minimum of power, about 8-12″. My approach speed was approximately 68 knots. I decided to land past the bad area off the end of the strip to avoid the heavy mud and ruts.

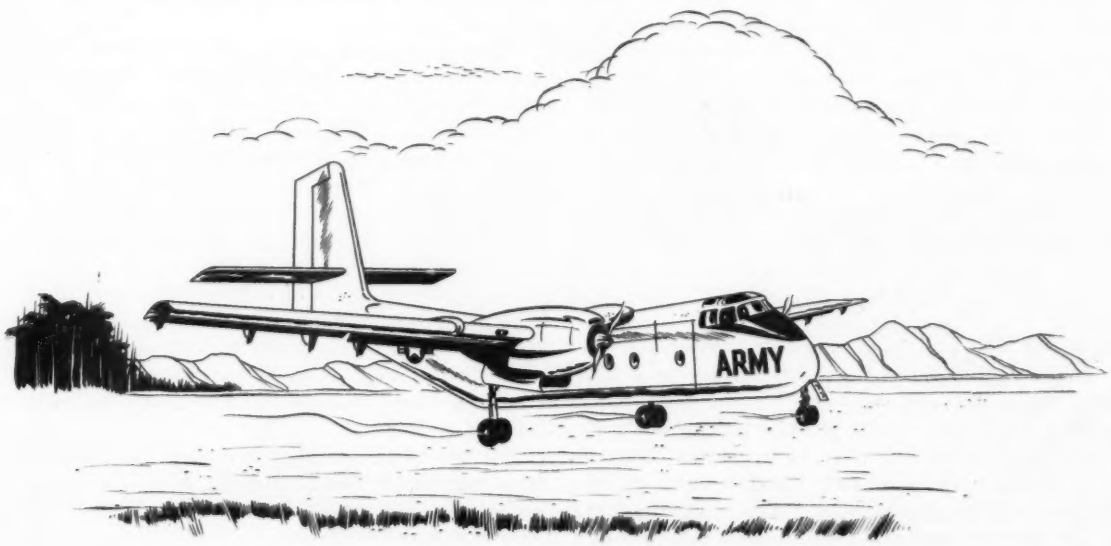
"On short final, there was a sudden wind shift and we appeared to have a quartering tail wind out of the east. Although the throttles were completely closed, the aircraft floated due to the tail wind and we touched down approximately 250 feet past my intended touchdown point. This left 1,000 feet of strip which I felt was sufficient since the aircraft was equipped with reversible props.

"The strip was slick and although I applied brakes immediately on both sides, I didn't experience any braking action. I also attempted to reverse the props by inserting the throttle handles up. There was a possible 2-3 second delay which seemed slightly longer than usual. At this time, I noted that I only had one blue light for the no. 1 prop, which indicated the no. 2 prop had not gone into reverse. I immediately decreased my pressure on the no. 2 throttle and tried to insert it back into the idle reverse position, thinking it had momentarily hung. By this time the nose gear was down and the landing roll veered slightly to the left.

"I elected not to use the one prop in reverse due to the slickness of the strip. I was still not receiving any response from the brakes. At this point, it appeared we had about 700 feet of strip remaining.

"Since I felt there was no possibility of stopping and that we would roll off the end of the strip and down the approaching gully, I decided to attempt a go-around. After applying full power, I called for flaps up as the aircraft approached the end of the strip. We broke ground at what seemed to be the edge of the strip and I hit the gear selector handle toward the up position.

"The aircraft was extremely mushy and it felt like we were between 45 and 55 knots. I tried to



maintain as close to nose level attitude as I could, considering the terrain clearance. As we approached the bluff on the other side of the gully, it was apparent the aircraft didn't have sufficient airspeed and was settling in. As we were about to make contact, I rotated the yoke back, bringing the aircraft into a nose high attitude, attempting to stall it in on top of the undergrowth and shrubs on the bluff. As we hit, I cut the throttles.

"The aircraft slid about 200 feet up to the top of the bluff and down the right side, coming to rest with a fairly good jolt and pointing 80° to the right from our takeoff direction."

The aircraft accident investigation board listed these cause factors:

1. The decision to execute a STOL approach and landing in a quartering tail wind, with touchdown approximately 680 feet beyond the approach end of a 1,600 foot runway.
2. Entire reliance on the braking effects of reversed propellers to stop the aircraft, rather than conventional methods.
3. Failure to establish and abide by a go-around point which would assure a successful go-around.

The board recommended that all CV-2 aviators be required to:

1. Compute weight and balance.
2. Determine density altitude.
3. Determine aircraft performance characteristics for takeoffs and landings, using hydraulic and aerodynamic braking.
4. Use reverse pitch propeller capability as an additional or backup method for braking.

High Screaming Noise

A UH-1B with an aircraft commander, pilot, crewchief, and four others aboard was making a climb after takeoff.

The aircraft commander: "We climbed out and broke to the left in a climbing turn, pulling 35 pounds of torque. At 1,200 feet, we heard a sudden high rising screaming noise and felt the aircraft shudder violently. The screaming noise went down a little, then back up higher, and the rotor and engine tachometer climbed above the gauge markings.

"I grabbed the controls and turned the throttle all the way down to ground idle. The engine continued to run high as I pushed the pitch full down. The pilot and I both were on the controls at this time.

"I took over and chose a possible landing site on a road. As we headed for it, I realized we'd hit short and possibly in the river. We had high rotor rpm in the descent and I pulled pitch to bring it down, but it seemed to make no noticeable change.

"I turned with cyclic and began to flare, trying to make a green marshy field. We were getting low to the ground and our groundspeed was getting low. I pulled pitch and the ship turned nose left and was heading for a 3 foot dirt dike. Flying sideways at the dike, I could see how bad it would be if we hit sideways. I turned sharp left, trying to get the nose in the direction of motion.

"We just cleared the dike, hitting hard and bouncing once. The ship was still moving in a direction slightly right of the nose direction. This caused us to rise up and almost go over to the right. This was when the blades flexed into the dike. I tried to hold the cyclic steady as there was a tremendous buffeting in the ship. I turned the fuel switch off and hit the battery switch, and we got out."

The cause of the screaming noise was found in the overspeed governor tachometer drive assembly. A piece of steel, 1/2" long and 1/8" in diameter had jammed between the gears in the overspeed governor tachometer drive assembly (FSN 2840-893-3787), causing the splined shaft (FSN 2840-522-2351) to shear. The piece of steel could not be identified.

The cause of this accident was considered to be the failure of the aircraft commander and pilot to recognize the nature of the malfunction, and failure of the aircraft commander to choose a suitable forced landing area. As a contributing factor, the board found that the pilot was not familiar with the autorotative characteristics of a heavily loaded UH-1B.

The reviewing official stated that instruction in both high and low side governor failures were now included in initial operational checkrides and quarterly standardization rides.

. . . to see that liberty's warm light does not flicker out.

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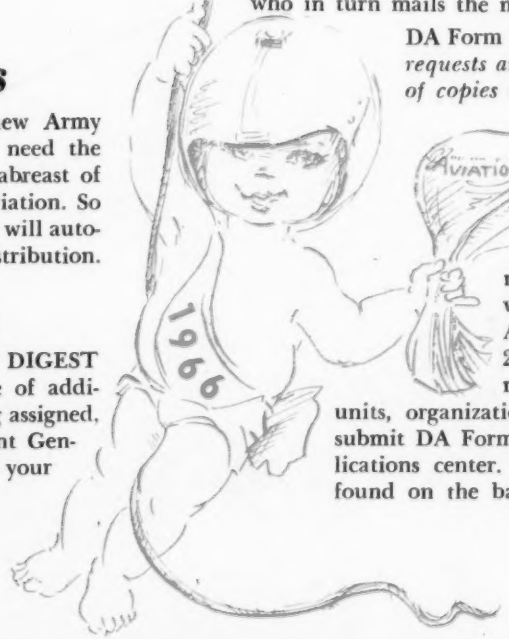
Old Units

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